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**Teaching, Learning and E-learning
(IAC-TLEI 2021)**

Reframing Education Delivery and Assessment during and after the COVID-19 Pandemic

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Abstract

Traditional education has assessed students' achievement of course learning outcomes using grading metrics. Although online learning has existed long before the COVID-19 pandemic, face-to-face learning has been the traditional and preferred instructional delivery method. The COVID-19 pandemic has caused educators to develop new ways of delivering instruction with the added element of public health as a newly prominent focus. As a result, new opportunities for student learning have emerged, but the challenge of measuring student engagement in what may continue to be a remote learning environment remains. Assessing student learning during and after the pandemic should involve determining the learner's involvement with the course. The standard learning measures of grading and quantitative student feedback surveys remain relevant, and the addition of a qualitative measurement would improve the understanding of the students' experience. This qualitative assessment would capture additional data to allow educators and administrators to gain a broader awareness of students' needs, achievements, and strengths.

Keywords: engagement, learning, assessment, qualitative, quantitative, health, hybrid, hyflex

1. INTRODUCTION

The COVID-19 pandemic disrupted many traditional educational practices. Institutions, educators, and students quickly realized that the conventional learning paradigm was unsustainable in terms of public health. This realization caused each group to question educational practices within the context of their respective realities. A literature review revealed that questions surrounding education were global, and scholars from many nations reflected similar issues with two common themes: delivery and assessment. The pandemic changed learning and education profoundly. Now that teaching and learning norms have changed, educational practice cannot return to its former state. Educational delivery and assessment are at an inflection point, and the future of education must include innovative technologies and consider the needs of educators, institutions, and students.

2. PRE-COVID-19 EDUCATION PRACTICES: KEEP, CHANGE, OR DISCARD?

Classroom education has traditionally been a passive activity for students: The instructor delivered an oral presentation, students listened and completed required work, and then the instructor issued a test to measure student

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understanding of the content (Ranaweera, 2021). The COVID-19 pandemic brought these traditional methods into question. “In early April 2020, statistics reported that approximately 1.6 billion, or 91.3% of learners in 188 countries across all levels of education globally were negatively affected by the compulsory school closure as a result of the lockdowns” (Sasere & Makhasane, 2020, p. 181). Face-to-face learning may be optimal in terms of quantifying student engagement and achievement of learning outcomes (de Borbo, Alves, & Compagnolo, 2019; Finnegan, 2021; Gay & Betts, 2020; Hanafi, Jumaa, & Araf, 2021). However, schools found themselves unable to deliver course content using traditional methods due to health concerns. Course delivery switched to a primarily online delivery system, disrupting the norms of in-class teaching and learning outcomes assessment to which instructors and students conformed.

Technological advancements available in 2020 created the opportunity for a shift in the paradigm of educational delivery. Without the physical boundaries of the classroom, professors and students could access digital tools that shifted students from a passive to an active role in their education. This shift created a new normal focused on educational value for the student (Glantz & Gamrat, 2020). The location where the education occurred mattered less than the student’s engagement with and understanding of the material. Schaffhauser (2021) noted that the shift to online teaching highlighted the value of in-person education and the importance of time in a shared physical location for instructors and students; however, the transition to online learning fundamentally altered the way teaching occurs.

In addition to redefining instructional practices, educators needed to reconsider existing evaluations of student learning. Zhao, Lin, Liu, Zhang, and Yu (2021) commented on using existing, primarily quantitative student assessment methods, noting that some may have become obsolete with the change in educational practice resulting from the pandemic. The use of in-person tests and was not simply unachievable—it was a health hazard. While that may sound extreme, knowledge of COVID transmission methods was merely unknown at the outset of the pandemic, and instructors were wary of accepting physical testing devices. Public health concerns were and continue to be a significant consideration and complete disruption to the education system. The World Health Organization (WHO) and the Center for Disease Control (CDC) defined parameters on daily living such as wearing a face mask and social distancing. Before federal and state guidance existed, schools made individual decisions regarding students’ ability to remain on campus and instructional delivery during the remainder of the pandemic. Without compromise, educators acted with student and personal safety in mind to limit the spread of the virus. However, through that time investigating ways to continue participation in the already-in-progress semester. In retrospect, the chance of contracting COVID by touching a student’s paper submission may have been less than was feared. However, the transition to alternative learning methods served two purposes: It kept educational stakeholders as safe as possible and explored opportunities for new, often innovative, assessment methods.

One instructional delivery and assessment used during the early parts of the pandemic was asynchronous course delivery. Asynchronous delivery, in which the students and instructors may access the course at any time without needing to be present either in person or online simultaneously, was one of the techniques attempted. Öztürk (2021) noted both the benefits and deficiencies inherent to asynchronous learning:

- Students could complete work during their preferred times and integrate their learning within the context of their family and work life, as opposed to making their life fit within the learning frame.
- Students had the opportunity to explore topics in as much depth as they chose, allowing for flexibility in achieving learning outcomes.
- Students could gain independence in their learning, therefore developing lifelong learning skills.

However, learners did not always reap these benefits because of asynchronous learning. Öztürk (2021) also noted a perceived lack of support and motivation among students because of the decrease in shared learning spaces. Access to courses became a function of using the internet. For some learners, the lack of internet access created learning disruptions. Schools adapted through innovative means such as providing connections through school buses that contained WiFi hot spots and directing students to access points to continue their learning. The adaptation to the temporary, new “normal” caused educators to evaluate many aspects of the students’ learning experiences and their teaching practices.

Al-Freih’s (2021) phenomenological work with teachers who shifted to online instruction noted the need to change teaching processes abruptly, sometimes forcing instructors to learn new technology in an emergency mode. Instructors had to find ways to engage with students using sometimes unfamiliar online platforms, limiting organic classroom discussions. Teachers found it necessary to rework course assignments and classroom activities to fit the computerized platform and establish new norms of classroom participation. The use of asynchronous courses caused student engagement to be challenging, and teachers’ attention to struggling students’ motivation involved additional

energy in a way not previously experienced. Nonetheless, teachers found ways to engage students, such as extended one-on-one times with students and innovative technological use of apps and internet resources.

As the world continues during the pandemic with an expected return to “normal” within the foreseeable future, some old teaching methods, assessment, and student engagement will inevitably fall away. The imperative of collocation of teaching and learning has diminished. Teachers and students could be in separate physical locations, if necessary, without significant disruptions to the course learning outcomes. Innovative practices involving hybrid learning are in use, evolving for future utilization. HyFlex teaching methods, in which the student may attend either in person or online, allow educational stakeholders to feel safe in their choice of educational delivery. The puzzle of student engagement and fulfilment of the social aspects of learning remains in question.

3. THE NEW “NORMAL” OF EDUCATIONAL DELIVERY AND STUDENT ASSESSMENT

Postman (1995) commented on the intangible quality of learning, noting the need to find motivation and purpose in the effort. Postman’s comments were jarring at the time of his writing: How could education be reduced to two simple needs? What about in-class experiences and long-held beliefs of the benefits and rituals of geographically situated school participation that society held dear? Would education devolve into chaos without the boundaries of time and space? Each of these questions was at the forefront of the collective consciousness as the need to separate physically for safety reasons became apparent in the early days of the pandemic.

Daniel (2020) noted that a return to established educational norms would likely not occur because of the flexibility discovered during the pandemic. Although society may eventually collocate safely, the proverbial Pandora’s box of newly available instructional techniques, internet-based connections, and the opportunity to emphasize educational purpose over location has been opened and cannot be closed. “Asynchronous working gives teachers flexibility in preparing learning materials and enables students to juggle the demands of home and study” (Daniel, 2020, p. 93). Both educators and learners can enjoy this opportunity to suit their needs. Woldeab, Yawson, and Osafo (2020) pointed out how higher education has been available online for years. The economic need for institutions to reduce costs is more evident now than ever before. Natow (2021) pointed out that colleges have had to adapt to shifting financial circumstances for decades. The COVID-19 pandemic forced schools to turn to online course delivery to continue instruction and remain economically viable. Daniel (2020) commented that the shift to online classes involved teachers who were subject matter experts but not necessarily technologically proficient.

Herein lies the problem: Schools needed to deliver the same content but had to use new, often unfamiliar technology – and engage students using said technology. Although Glantz (2020) noted how many students were able to transition to the online learning environment, the ones who did not make the shift as successfully – or at all – became at risk of falling behind in their learning. Gonzalez (2021) commented about the transferability of educational practices from the classroom to technological platforms, noting the lack of availability and accessibility for some students and the amount of work necessary on the teacher’s part to emulate the classroom environment without being able to share space. The challenge, which seems simple to people not directly involved in classroom teaching, is that electronic classroom replication is impossible. The sense of being in a shared space with an exchange of ideas and knowledge is not and cannot be identical to an electronic meeting because of the differences inherent to each type of learning space.

One factor that has been effective in teaching online is the instructor’s attitude toward the use of technology. Woldeab et al. (2020) noted how faculty comfort and support when using learning technology were crucial factors in a positive online learning environment. Zajac and Lane (2020) continued this idea by highlighting those teachers who exhibited a positive and caring online presence had more successful online teaching experiences. Acts of caring, kindness, and flexibility directed toward students made the online classroom experience as positive as possible for students (Zajac & Lane, 2020), an idea that is common to both the traditional and the online classroom experience. The difference between the two formats is that body language and tone are easier to communicate and interpret in person but require deliberate effort in an online format. Furthermore, as influenced by the learning environment, the teacher’s attitude affects student learning and assessment performance.

Gamage, Silva, and Gunawardhana (2020) commented on the assessment of student learning. In a traditional setting, formative and summative assessment practices occur in conventional fashions. The transition to online learning made both types of assessments more challenging in terms of delivery and integrity. Thankfully, newer online tools (e.g., Padlet, Kahoot, etc.) could facilitate formative assessment and promote student engagement. Summative assessment became more challenging, and student “sharing” information for the summative evaluation

became easier (Gamage et al., 2020). The question then turns to effective assessment methods to sustain educational integrity and prove mastery of learning outcomes during and after the pandemic.

4. ASSESSMENT QUANTITY VS. ASSESSMENT QUALITY

Some teachers use few points to assess student understanding, which creates a high-stakes testing environment that could be stressful for teachers and learners alike. Other instructors prefer to offer multiple assessment points to promote an environment with many data points to measure student attainment of course learning outcomes. While each assessment method has its merits, the challenge is to determine what could be the best in an online format. Morales, Posso, and Florez (2021) found that all assessment points are significant student performance indicators. Finnegan's (2021) research concluded that students perceived time pressures and other intervening variables such as computer access limited their ability to perform optimally on assessments. Bagheri and Zenouzagh (2021) completed a study and found that online (aka computer-mediated communication) courses limited students' requests for assistance during assessments, which could have impeded their performance. In other words, the lack of the student's ability to ask questions and technologically based challenges could negatively impact the student's performance.

These findings lead to an interesting problem, especially in large educational institutions during online instruction: To what extent is personalized learning available for students? It is easy for a student to become a person in the crowd who is not always personally known by their teachers at large institutions. Lewis, Heath, Li, and Roberts (2021) commented that the students need to be personally known to their teachers. One of the most poignant comments that emerge from Lewis et al.'s (2021) work was the following passage:

Because I feel like someone is noticing my work. I didn't feel controlled... I felt motivated because someone is noticing that I'm there, I'm trying to figure it out, I'm trying to listen to the video to do the practical. I'm doing this for me to have a better understanding, but someone else, my lecturer, my tutor, is noticing this. I'm not a number. I'm someone to them (p. 31).

For students in a large classroom, especially online, it can be challenging to make a personal connection with the teacher. Furthermore, students occasionally use the anonymity of the online environment to evade the teacher's attention. For other students, the teacher's attention during and after an assessment is vital because it makes the learning more personalized and relevant to their educational process. Farrell and Brunton (2021) noted that teacher engagement with students is commonplace in a traditional classroom but takes on a different meaning in an online class. Crawford et al. (2020) reminded us that although the access to technology may differ among countries, the use of the available resources is critical, and student performance connects to teacher engagement. The teacher's engagement with the student offers support and personalization, leading to richer student engagement and later demonstrating learning outcomes better.

The literature points to the need for higher quantity and quality of assessments in an online classroom. Teachers must create rapport with each student and use multiple assessment points to ensure a positive experience and successful attainment of learning outcomes. Hew, Jia, Gonda, and Bai (2020) found that students whose teachers required the use of cameras during online learning sessions reported more engagement in the course because, despite the isolation, they could feel as though they were part of the course. For assessment purposes, having the students' cameras on during online sessions offers another assessment point because it becomes easier to know who is engaged during discussions. The interesting facts about student engagement via a camera during class sessions are that teachers may not need to add more assessments but could include the on-camera engagement as a formative assessment of student learning. Additionally, the idea that both students and teachers may need more time with online teaching for this type of assessment to become comfortable (Sasere & Makhasane, 2020).

The assessment of student learning needs review in an online class. The idea of online engagement, preferably by a camera but also in online discussion boards, needs to be considered an assessment piece. By assessing student engagement, students could become more sensitized to the need to be "present" in their classroom interactions, which is a relevant skill they may need later in life. Second, online engagement is a significant factor in student learning because the student's interactions with the teacher affect their academic performance. This enhanced student-teacher engagement is a factor that will be a prominent part of teaching as the world makes its way through the pandemic. Furthermore, it could create additional learning delivery methods that may not have existed before the pandemic, such as access to courses and collaboration despite geographical location. As an assessment piece, the

attenuation to engagement and presence in an online setting is a skill that could transfer from educational to professional settings.

5. DELIVERY AND ASSESSMENT: DURING AND POST-COVID-19

The COVID-19 pandemic has forever altered educational delivery. In many ways, the traditional ideas of pencil and paper may ultimately become obsolete, although they are still relevant skills in certain academic levels and disciplines. UNESCO (2019) noted that changes to educational delivery and implored educators to consider the possibilities of technological integration in learning design, noting that “human interaction and collaboration between teachers and learners must remain at the core of education” (p. 5). As educators responded to the public health and safety needs at the outset of the pandemic, the rapidly adopted shift to electronic delivery, while necessary, may be unsustainable because it removed the physical interaction between teacher and the learner. It is wise to consider UNESCO’s reminder because that human interaction, while facilitated by technology, cannot be entirely replaced without impeding the one-to-one aspect of the learning process.

Learning assessment faces similar challenges. Fuller, Joynes, Cooper, Boursicot, and Roberts (2020) questioned the “why” and the “when” of assessment and urged consideration of decisions made during the chaos of the pandemic response. Permanent changes to an assessment made during this pandemic may not be the optimal course over the longer term. Fuller et al. (2020) urged the use of lower-stakes assessments to retain the personalized aspect of learning. Online learning contains many elements of personalized learning and has proven to be highly effective when using a student-centric model. Titarenko and Little (2021) noted the potential for enhanced international learning but commented that personalization must exist for the learners to achieve success. The overwhelming theme that has emerged during the pandemic is the need for compassion in designing learning and assessment, both for learners and teachers.

The use of online technology has opened a world of possibilities for teachers – sometimes overwhelmingly so – and mastering the use of new resources and technologies may not be universally available yet. It has also increased educational access for students who may not otherwise engage in traditional education. With these new learning opportunities comes an enhanced ability to measure and improve student engagement and make more meaningful connections that could influence student abilities. A point of caution in using these technological opportunities is to remember the need for interpersonal interaction and engagement, the imperative of academic rigor, and the consideration of the quality of the learning environment. The institution, faculty, and students must create a safe, effective, and balanced learning environment that benefits each group. The way to accomplish these outcomes would involve a 360-degree approach (Agyepong, Owusu-Ansah, & Annoh, 2021) to ensure a viable and sustainable system. Refinements, such as open-ended questions for various stakeholders to reflect on their perspective of the learning experience, could offer insights into individual experiences. These refinements could inform the process of shifting from pre-pandemic course delivery and assessment techniques to new, sustainable, and richer learning experiences.

6. CONCLUSION

The COVID-19 pandemic highlighted a demand for innovative technologies in education and a heightened awareness of stakeholder needs. The return to traditional educational methods may no longer be practical after the pandemic concludes, as reflected by scholars from various countries. The way forward must include a sustainable and compassionate consideration of student needs, instructor abilities, and broader compassion for each group’s challenges. It is time to embrace these aspects of education to create a sustainable future that includes technological advances and personalized instruction. Most importantly, it is now time to abandon the old-fashioned model of life bowing to educational demands and for education to fit within the realities of people’s lives.

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Strengths of the Character of High School Students and Their Relationship to the Classroom Climate

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Abstract

Our research study deals with the strong character attributes and a climate of a school classroom. In the first part the basic theoretical terminology is explained and a new psychological direction – positive psychology - is introduced together with its main three pillars. An individual part is devoted to the strong character attributes and virtues as one of its main issues. The climate of the classroom is defined, its kinds, factors, and describes strategies for its improvement. It deals with the positive ethical classroom climate and connecting character education. The study is mainly focused on empirical research of which aim was to find out the relationship between strong character attributes and the classroom climate in secondary school classrooms.

Keywords: positive psychology, the character strengths and virtues, class climate, high school students

1. INTRODUCTION

The presented article focuses on the current topic related to the positive psychology - the character strengths and virtues. Positive psychology is an area of psychology that originated in the late 20th century in the United States. With its radical views and ideas, it initially aroused a strong wave of criticism, but now, after more than twenty years of its existence, some of these ideas have proved important and have enriched the psychology to date with important topics. The creation of research tools designed to identify positive human qualities and strengths of character played a part in this fact. However, positive psychology does not exist in isolation, but it tries to apply its findings to other scientific disciplines and a new trend of applied positive psychology is emerging. This section of psychology uses its results mainly in counselling, psychotherapy but also in the educational process. Knowledge of the strengths of the nature of the subjects of the educational process is a necessary condition for the implementation of successful and quality education. It is important to realize that the strengths of the people with whom the student comes into daily contact have a significant impact on his or her personality and behaviour. Also, these personality characteristics affect the overall climate of the place where education takes place, i.e., especially the classroom.

The aim of the research was to find out the relationship between the strengths of character and the climate of the secondary school classroom. Identifying the relationship between the strengths of character and the class climate is of great importance. If we can diagnose strengths in a simple and effective way, we will be able to apply an individual approach to each student, which would respect and further develop these aspects. At the same time, the global results of character strengths found among high school students will make it possible to derive educational strategies to strengthen existing strengths and build those strengths that are underdeveloped. The obtained results can be applied in the study of their relationship in relation to other phenomena of educational reality. Creating a favourable classroom climate is not an easy task for teachers. Its quality is affected by many different factors.

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1. Positive psychology and strengths of character

"Positive psychology has a very short history but a very long past" (Peterson, 2006, p. 4). Positive psychology, like other directions of humanistic thinking, has its roots in ancient antiquity. The history of this new scientific discipline ranges from the thinking of the Athenian philosophers in the west to Confucius and Lao in the east. A little later, we encounter the ideas of religious figures and theologians - Jesus, Buddha, Mohammed, Thomas Aquinas, and many others, who also asked questions about the meaning of quality life and outlined some ways to achieve it (Peterson, 2006). Today's positive psychologists have identified common themes of various world thinkers and philosophers and emphasize the meaningfulness of life that can be found in long-term spiritual endeavors (Gable, Haidt, 2009). At the end of the 20th century, a new field appeared in psychology - health psychology, from which positive psychology also draws its starting point. Positive psychology has changed with the focus of interest from negatives to what strengthens the mental health and well-being of individuals. J. Křivohlavý (2007) points out the most common causes of death in 1900 and 2000. While in 1900 the most common causes were infectious diseases, tuberculosis, pneumonia, and influenza, in 2000 they were cardiovascular diseases, cancer, injuries, etc. Since 2000, the characteristics of causes of death have shifted elsewhere. In the background of these diseases are not primarily physical, but especially mental factors. Research the negative effects of stress and psychosomatics has shown what is needed to focus on the moment is to be sought in the psychological realm. Experts have made great efforts in the field of pathology, specifically in understanding, treating, and preventing psychological disorders. Many classifications and manuals of these disorders have been created, mention e.g. The Diagnostic and Statistical Manual of Mental Disorders from 1994 and the International Classification of Diseases from 1990. Thanks to them, there are now effective psychological and pharmacological treatments for those diseases that have been in place (Seligman, Csikzentmihalyi, 2009). According to Křivohlavý (2010), one of interest in positive psychology is that the current interest only in negative phenomena can lead to seeing the world only in black.

The term "positive psychology" was introduced at a conference of the American Psychology Association in 1998 by its chairman, the Martin E. Seligman. He pointed out that since World War II, psychology has focused mainly on pathology, which certainly has its merits, but nevertheless the mission of psychology remains unfulfilled because it does not answer the important question of how to make human life better. Representatives of positive psychology, C. S. Snyder and S. J. Lopez (2002), proposed a separation from previous psychology, declared independence from the pathological model, and planned to create a separate and distinct science. The first conference on positive psychology was held in 1999 in Lincoln, Nebraska. In the same year, the Manifesto of Positive Psychology was published, which was revised in 2000 with the publication of the monothematic issue of the American Psychologist and the Journal of Happiness Studies (Scheldon, 2000). In 2004, a positive-psychological analogy of the DSM Characteristics of Strengths and Virtues: A Handbook and Classification was published (Seligman, Peterson, 2004). The Journal of Positive Psychology has been published since 2006. Since then, positive psychology has become quite visible among other psychological disciplines (Peterson, 1999). According to M. E. Seligman and M. Csikzentmihalyi (2000), the main goal is to build the best quality of life. In addition, their focus is on research and support of the positive potentials and tendencies of the human personality, and more recently they have focused mainly on the strengths of human character and moral characteristics (Peterson, Seligman, 2004). The trend of positive psychology to apply the acquired knowledge in practice is also important. Emphasis is placed on the use of results in the field of lifestyle, in the educational process, in psychotherapy and counseling, in the psychology of management and in public administration (Slezáčková, 2010). In positive psychology we can find a complex scheme describing and explaining the so-called good life.

We can divide this field into three basic pillars (Peterson, 2006):

- Positive subjective experiences (happiness, joy, satisfaction and fulfillment, etc.).
- Positive individual traits (strengths of character, talents, interests, values, etc.).
- Positive institutions (families, schools, businesses, communities, companies, etc.).

In recent years, positive psychology has focused on identifying character as one of its pillars and the center of understanding the positive good life. The strengths of character and virtue fall into the positive individual traits (characteristics) of man. A new approach is applied here in thinking about character, intelligence, creativity, etc. Character needs to be approached systematically in multidimensional terminology. At the beginning of the study, the main problem was to answer questions related to the character (e.g., it is possible to define the character in the active sense, it consists of several aspects, there are character levels, the character can be learned, evolves, etc.). Strengths of character are understood as peculiarities of a person's personality, as more permanent characteristics, dispositions, and individual personality traits. In addition, however, there is a view that emphasizes that the positive aspects of character may depend primarily on the ability to use various resources and available

skills, as well as the skills necessary to solve problems or to achieve the necessary goal, for self-regulation and the like. (Staudinger, Pasupathi, 2000, In: Mareš, 2008). Ch. Peterson and M. Seligman, the authors of this taxonomy, tried not only to capture which virtues belong to the set of strengths of character, but also to include lower, more specific phenomena of these characteristics. Thus, they managed to outline not only a horizontally richly structured but also a vertically graded understanding of the strengths of the character.

2. Taxonomy of character strengths

M. Seligman with Ch. Peterson (2004) defined each moral virtue and set an example for it individual items.

1. Wisdom and knowledge

- a. Creativity (originality, ingenuity) - to think in new and productive ways in conceptualizing themes and in carrying out activities, this aspect of character also includes artistic performances, but is not limited to them.
- b. Curiosity (interest, search, openness for experience) - to be interested in constantly gaining experience and only for themselves, to explore fascinating areas and topics, to research and discover.
- c. Judiciary, open-mindedness (critical thinking) - to think about things and examine them from all angles, not to draw quick conclusions, to be able to change one's opinion if there is provable evidence, to carefully consider all arguments.
- d. The joy of learning - improving new skills, topics, and knowledge, whether through study or through formal education and training, is usually linked to curiosity, but goes beyond the tendency to spread and enrich what the individual knows very systematically.
- e. Perspective (wisdom) - to be able to give advice to others, to have one's own view of the world that gives the individual meaning.

2. Courage, bravery

- a. Heroism (boldness) - not to back down from a threat, challenge, difficulty, or pain, to say what one believes is right, even if it is against the majority, to stand up for one's opinion, even if it is unpopular, it also contains physical courage.
- b. Perseverance (diligence) - trying to complete what has been started, persevere in action regardless of obstacles, feel satisfied with finishing the tasks to the end.
- c. Honesty (authenticity, integrity) - to tell the truth, but to clearly present oneself without pretence and to act honestly, to be oneself without pretence, to be responsible for one's feelings and actions.
- d. Zeal, taste (vitality, enthusiasm, energy, strength) - approach life with excitement and energy, do not do things only in half, live life as an adventure, live actively and fully.

3. Humanity

- a. The ability to love and be loved - to respect very close personal relationships with other people, especially those who reciprocate and develop these relationships, to be in an intimate relationship with someone.
- b. Goodness, kindness (nobility, generosity, compassion, altruistic love, attention) - to do good deeds, to make life easier for other people, to help them, to take care of them.
- c. Social intelligence (emotional intelligence, personal intelligence) - to be sensitive to the feelings and motives of oneself and other people, to know what needs to be done in different social situations, to know what motivates other people.

4. Justice

- a. Teamwork (citizenship, social responsibility, loyalty) - work well as a member of a group or team, be loyal to a group, share with people the good and the bad.
- b. Impartiality - treating all people decently and fairly, not allowing personal feelings to influence decisions that affect other people, giving everyone a chance.
- c. Initiative, leadership - to encourage the group of which the individual is a member to complete things, while maintaining good relations between the members of the group, organizing group activities, monitoring, inspiring and guiding them.

5. Mildness, restraint

- a. Forgiveness - the ability to forgive someone who has done something wrong, to accept people with their shortcomings, to give them a second chance, not to be vindictive.

- b. Modesty, reserve, humility - to allow the other person to speak for himself, not to try to be the centre of attention, not to perceive himself as someone special.
 - c. Caution, prudence - choose carefully, do not take excessive risks, not do, or say things that can later be regretted.
 - d. Self-control - to control what a person experiences and what he does, to be disciplined, to control his urges and emotions.
6. Transcendence
- a. Recognition of beauty and quality (miracle, respect, wonder) - to be receptive and to have a sense of beauty, perfection, and masterpieces in various areas of human life (from natural beauty, through art, mathematics, natural sciences to everyday experience).
 - b. Gratitude - be aware of the good things that have happened and be grateful for them, find time to express gratitude.
 - c. Hope (optimism, future orientation) - expecting the future to be better and trying to make it so, being convinced that we can achieve a better future.
 - d. Humour - to like fun and laughter, to make others laugh, to see the world from a better angle, to joke promptly.
 - e. Religion, spirituality (faith, religion, meaning) - to be convinced, to believe that the whole world has a higher purpose and meaning, to know where man has a place in each broader plan of the world, to believe in the meaning of life, because he leads man and provides him consolation.

The authors of this taxonomy point out that the current wording may not be final. As they further claim, it was very difficult to create a classification that would be always valid and in every culture. For this reason, they decided to create a variant that can be applied to the American and European middle class. Thus, they assume that it will be adjusted in the future, thanks to empirical research and new theoretical approaches. The school represents a support system outside the family. Half of the children who have grown into full-fledged adults say that the supportive teacher has created a positive model in their lives. Schools are important protective environments in children's lives and creating a supportive school environment helps children in all directions (Gilman, Huebner, Furlong, 2009). Sometimes it is not easy to answer the question of who mainly creates the climate of the school classroom and what influences it the most. From the beginning, it was assumed that it was mainly the person of the teacher, because the class reacts differently to each teacher. The second opinion was that the climate is created mainly by students. The argument was that each class is characterized by something special, which it retains even with changing teachers. The third stream represents the view that the classroom climate is co-created by teachers at the same time as students (Hlásna, 2005).

The pupils' pleasant and safe feeling in the classroom is mainly influenced by the teacher's personality. However, the students themselves also play a very important role. J. Mareš (1998, p. 3) states that "pupils' learning and behaviour is influenced by the microsocioal environment of the school, the specific teaching staff, the school class and the peer group." He also claims, that "this reference group much greater influence the student than teachers or parents." A school class is „a formal group made up of students who get into or stand out from different relationships. Social phenomena in the classroom influence students' attitudes, their expectations, emotions and school success." (Průcha, Walterová, Mareš, In: Janíková, Najvarová, 2009, p. 84). The student can be characterized as "a person who is in the role of the subject and is not age-restricted" (Průcha, Walterová, Mareš, In: Janíková, Najvarová, 2009, p. 84). We characterize the school class as "a small social group, which was created intentionally, in an organized way, has a solid organization and its activities are long-term" (Gajdošová, In: Janíková, Najvarová, 2009, p. 86).

Interpersonal interaction is one of the basic processes in which the classroom climate is created. One of the important indicators of climate is also student behaviour (Hanuliaková, 2010). During school attendance, an informal structure of the status of individual pupils in the class is created in the classroom. Based on them, students can be divided into so-called stars, admitted, and preferred students, non-admitted students and rejected and isolated students. This status is mainly influenced by the student's achievement, appearance, and abilities. Attractive appearance and abilities predetermine popularity among classmates, on the contrary, a good benefit can sometimes be a burden.

M. Vágnerová (2005) points out the fact that one of the most important needs of school-age pupils is the need for contact with peers. This peer group is an important social environment. The child becomes one of the members of this group and must accept certain rules, but at the same time manifest himself as an individual being. Here it is as if they automatically learn to cooperate, control themselves, manage various tasks and be in solidarity. The school class is one of these peer groups. The position that a child acquires in this group determines his or her identity. How a child is perceived by his classmates has different rules, there is a greater equality of tasks and a

greater possibility of active participation than when interacting with adults. The children are constantly compared in the classroom, both in the academic and social field. Students who are more accepted in the class team have the prerequisites for greater success and have a higher motivation for school performance (Santrock, 2008). However, it is important to realize that climate as a variable takes on a clearer meaning in relation to "something" (Clapp In: Furman, 1998). If we talk about the environment or the climate, we usually associate something with it that makes it important to talk about the environment. The concept of climate thus becomes meaningful when we specify in more detail what a certain psychological environment is supposed to support. For the first time, J. Lašek (2003) used a pilot version of the KLIT questionnaire to determine the classroom climate in secondary schools, which he then compared with the level of life satisfaction. The research sample consisted of 206 adolescents. He used the Bern questionnaire to determine life satisfaction. A. Groba (1995) Berne Questionnaire of Subjective Well-Being-Adult Form, which examines the six basic elements that make this life satisfaction: a positive attitude to life, problems experienced, somatic problems, self-esteem, depressed moods, and life joy. He found that the level of climate is closely related to the joy of life of individual students. The more problems students have, the greater is their tendency to be mediocre. The joy of life, reinforced by the minimal incidence of depression, somatic problems, a high positive attitude to life and high self-esteem, lead to a tendency to succeed (In: Lašek, Kupčėková, 2003). J. Mareš and J. Lašek (1996) point out that based on the peculiarities of the climate of a given class, it is possible to assume a certain way of behavior of students and their progress in the cognitive sphere or emotional area. Class climate research helps to reveal the social structure in the classroom (Wardová, 1994, In: Průcha, 1997) as well as the individual characteristics of individual students (Lašek, 2001).

In previous research on a student's personality, the researchers could not agree on whether it was better to describe the student with a series of characteristics that they sought to express quantitatively, or to place him in a certain typological group. The disadvantage of the second method is that these typologies are based on a global understanding of personality and thus do not allow sufficient differentiation of students. The dynamic theory of personality was developed by Lewin and later by Murphy (In: Ďurič, Štefanovič, 1977). However, this model also did not produce satisfactory results.

1. In Slovakia, various methods are used to get to know a student's personality. Ľ. Višňovský (2000) characterized the areas on which it is important to focus when examining the student's personality: 1. motivation, interests, and inclinations, i. e. what the student wants, what he strives for, what are his life goals.
2. abilities and talents (intellectual, creative, special - talent)
3. Character, i.e.. what the student is like at present, what are his / her attitudes and opinions on various aspects of social life, his / her worldview orientation.
4. Temperament, typology as information about the student's character.

So far, there is no single model for identifying students' strengths. Observations, interviews, anamnesis, etc. are used. However, these methods are often influenced by the teacher's subjective opinion and therefore it is appropriate to bring to Slovak schools a diagnostic method that would be effective to reveal the strengths of the character of students objectively. The Via-Youth questionnaire (Park, Peterson, 2006) seems to be a suitable option, which makes it possible to measure these strengths. The Via-Youth questionnaire was preceded by a questionnaire called VIA-IS (Seligman, Peterson, 2004), designed for the adult population. Before its final version, it underwent five modifications and was filled by 150,000 people from the USA, Canada, Australia, Europe, South America, Asia, and Africa. If we summarize the previous results found in American adolescents, we can state that (Peterson, Seligman 2004, Park, Peterson, 2006, In: Mareš, 2008):

- the variable "mildness, restraint" is more difficult to diagnose in adolescents, it is probably more dependent on the context in which it manifests in adolescence,
- children and adolescents have significantly higher scores for the variable "humanity" and significantly lower scores for the variable "mildness, restraint" than for other variables,
- in most variables, girls score higher than boys,
- as the age increases, the score of the variables increases, but in the 10th grade students there is a slight decrease in moderation, restraint, and spirituality,
- there are no significant differences between ethnic groups, only African Americans have higher values in spirituality,
- life satisfaction and the feeling of happiness correlate with most of the strengths of the character, only with wisdom they do not have such a close relationship,
- values found in moderation, restraint predict children's benefit in English, mathematics, and science, if the influence of abilities is controlled,

- the exploratory factor analysis of the Via-Youth questionnaire reached a four-factor solution, in contrast to the theoretical model, intellectual and emotional variables were combined into a single factor. If this finding were confirmed on a larger sample, it could have an impact on the different design of educational and training activities.

3. Defining a research problem

In the research part of our work, we focus on determining the relationship of character strengths to the climate of the class. We find out this relationship by the methods of quantitative research, specifically by the method of the questionnaire. Our main goal was to find out how the strengths of character are reflected in the climate of the school classroom and which of these strengths influence the positive classroom climate. Understanding the character of students is extremely important for the educational reality. The present time requires higher intellectual abilities, independence, creativity, higher motivation, individual commitment, activity, and responsibility. If we want to educate such a harmonious personality, we must know the initial peculiarities of each student. This harmonious personality can best develop in a creative and positive social climate. In our research, the emphasis is mainly on how the climate is perceived and interpreted by the actors themselves, because it is the subjective view that influences their thinking, decision-making, and action. By focusing our attention on the social climate of the classroom, we increase efficiency in four directions:

- a safe climate strengthens motivation and improves the neuropsychological preconditions of students and teachers to perform tasks,
- is important for the current course of teaching,
- increases the quality of educational outcomes in the long run,
- induces a positive experience, reduces the risk of stress and anxiety and, as a result, strengthens the balanced self-confidence of the personality as a basis for its healthy development and mental resilience in adulthood.

When defining a research problem, it is necessary to realize what is the main content. Since we examine the relationship between two objects, the strengths of character and the climate of the class, it is a so-called relational research problem, which puts a phenomenon or factor into a relationship. A research problem is defined by a question. The final formulation of the research problem is: *What is the relationship of character's strengths to the class climate?*

3.1 Research objectives and determination of research hypotheses

The aim of the research was to find out what strengths of character prevail in students of different types of secondary schools and what is their relationship to the classroom climate.

Sub-objectives:

1. To detect if there is a relationship between the strengths of character and the class climate.
2. To detect whether there are statistically significant differences in the strengths of the character depending on gender, age, type of school.

These goals will help us identify the following hypotheses:

H1: We assume that no statistically significant differences will be found in the strengths of character and climate factors of the class depending on the type of school.

H2: We assume that no statistically significant differences will be found in the strengths of character and climate factors of the class depending on the year of study.

H3: We assume that girls will have a higher average score of character strengths than boys.

H4: We assume that the high score obtained in the field of supportive climate determines the high score in the strengths of character: goodness, teamwork, impartiality, forgiveness, social intelligence, and the ability to love and be loved.

H5: We assume that the high score obtained in motivation for negative school performance determines the low score in the strengths of character: creativity, curiosity, joy of learning, perspective, perseverance, zeal, and hope.

H6: We assume that the high score obtained in the field of self-enforcement determines the high score obtained in the strengths of character: zeal, perseverance, heroism, initiative, and self-control.

We used a modified Via-Youth questionnaire to identify strengths of character (Park, Peterson, 2006) and a KLIT questionnaire to identify classroom climate factors (Lašek, 2004). The research sample consisted of high school students in county town in western Slovakia. Specifically, they were students at a grammar school, a hotel academy, an economic academy, a secondary art school, a secondary vocational school of construction and a secondary medical school. 205 boys and 323 girls took part in the research. The total sample consisted of 528 respondents aged 15 to 19 years. The distribution of respondents by type of school, gender (Table 1) and year (Table 2) is given in the following tables. The research was carried out in the months of September 2011 - February 2012 directly at secondary schools after consultation with a representative of a specific school. In the following chapters, we present the results of both research questionnaires divided by type of school, grade, and gender. In one of the mentioned chapters, we will define the found relationship between the results of individual strengths and three categories of class climate.

Tab. 1: Distribution of respondents by type of school and gender

Type of school	Grammar School	Hotel Academy	Economic Academy	Secondary Art School	Secondary Vocational School of Construction	Secondary Medical School	Entirely
Boys	36	36	27	18	75	13	205
Girls	64	52	62	67	19	59	323
Entirely	100	88	89	85	94	72	528

Tab. 2: Distribution of respondents by year of study and gender

Year of study	1.	2.	3.	4.	Entirely
Boys	53	48	61	43	205
Girls	97	63	82	81	323
Entirely	150	111	143	124	528

3.2. Evaluation of research hypotheses

Sub-objectives:

1. Find out if there is a relationship between the strengths of character and the class climate.
2. The results found in hypotheses 4 - 6 specifically respond to this sub-objective.
3. To find out whether there are statistically significant differences in the strengths of the character depending on gender, age, type of school.

Hypotheses

H1: We assume that no statistically significant differences will be found in the strengths of character climate factors of the class depending on the type of school.

Our research found an above-average success rate in SSCH in a secondary art school compared to the overall average in almost every category; on the contrary, the construction school lags far behind the overall average. In the virtues of wisdom, transcendence and courage, the secondary art school won. In virtue of humanity, it was an economic academy, in justice a hotel academy, and in moderation, restraint a high school. In terms of classroom climate factors in the supportive climate, all schools ranked on average, with the business academy performing best and the secondary medical school worst. The hotel academy and the lowest secondary art school received the highest score in the motivation for negative school performance. In self-promotion, the highest number of points was achieved by a secondary art school and the least by a grammar school.

This hypothesis was confirmed.

H2: We assume that no statistically significant differences will be found in the strengths of character and climate factors of the class depending on the year.

No significant differences in the strengths of the character were found within the years. Slight differences were found only in the SSCH judiciary and openness of mind (between the first and second grade) and sincerity (between the first and fourth grade), and fourth graders performed best in sincerity. Also, no statistically significant differences were found in the climate categories.

This hypothesis has not been confirmed.

H3: We assume that girls will have a higher average score of character strengths than boys.

According to our research, girls achieve an average higher score in almost all strengths of character and virtues, only in SSCH initiative and leadership did boys achieve higher average scores.

This hypothesis was confirmed.

(pos. H3 was determined based on research in American adolescents).

H4: We assume that the high scores obtained in the field of supportive climate determine the high scores obtained in the strengths of character: goodness, teamwork, impartiality, forgiveness, social intelligence, and the ability to love and be loved.

Within the supportive climate of the classroom, a positive relationship emerged with a strong character of the ability to love and be loved. No other significant relationship was found in the other strengths of the character.

This hypothesis was confirmed.

H5: We assume that high scores obtained in motivation for negative school performance determine low scores obtained in the strengths of character: creativity, curiosity, joy of learning, perspective, perseverance, zeal, and hope.

As part of the motivation for negative school performance, a negative relationship was found with a strong point of character, the joy of learning and perseverance and tenacity.

This hypothesis was confirmed.

H6: We assume that the high score obtained in the field of self-enforcement determines the high score obtained in the strengths of character: zeal, perseverance, heroism, initiative, and self-control.

As part of self-enforcement, a positive relationship was found with the strong side of the character's creativity, perseverance, tenacity and a negative relationship with modesty, reserve, and humility.

This hypothesis was confirmed.

3.3. Conclusion of the research and recommendations for pedagogical practice

The research on character strengths revealed differences in outcomes across different types of schools and genders. On the contrary, the year has no effect on these strengths. Within secondary schools, the secondary art school excelled in almost all categories (except for moderation and restraint), and the secondary construction school performed worst. This fact may also be influenced by gender representation in the mentioned schools (in secondary art school it is the predominance of girls and in secondary construction school the predominance of boys), as girls received on average higher scores in almost all strengths of character. Gratitude was placed in the first three places overall (within all secondary schools), humour in the second place and curiosity in the third place. In the last three places, caution, prudence, initiative, leadership, and perspective ended. If we were to list specific virtues in order, transcendence ended first, humanity, courage and bravery, justice, wisdom, and finally, restraint. In the supportive climate of the classroom, all schools were on average. There were also no extreme differences either in grade or gender. In motivation for negative success, the secondary art school reached below-average values, which means that the students at this school try to avoid failure in school. As this school also achieved an above-average self-promotion category, students tend to excel over other students in the class, with competition prevailing instead of cooperation and a supportive climate. It is interesting that other secondary schools (apart from the mentioned secondary art school and secondary medical school) achieved below-average results in self-enforcement. It is certainly difficult to generalize and argue that high scores obtained in the strengths of character have a positive effect on the creation of a supportive (supportive) class climate. Research has only shown that, among all SCHs, SCH is affected by the ability to love and be loved.

On the contrary, greater dependence manifested itself in the following two categories, in the motivation for negative school performance and self-assertion. The motivation for a negative school performance is influenced by the low score in the SCH, the joy of learning and perseverance, tenacity. Self-enforcement is influenced by high scores in creativity, perseverance, tenacity, and low scores in modesty, reserve, and humility.

Based on the results of the research, we will try to define several recommendations for pedagogical practice:

- Teachers should know the strengths of the character of individual students and based on this knowledge, adapt activities and the form of clarifying the curriculum.
- Teachers should create a climate in the classroom that encourages student collaboration, friendships, and strengths. Situations and relationships that young people experience in high school can often affect them for life. At the same time, however, it is good to cultivate students in a reasonable degree of ambition and self-assertion, but never at the expense of their classmates.

- It is important to realize that especially during adolescence, students are very critical of any misconduct by adults. For them, the teacher should be an example and model of moral behaviour and should profess the values to which he systematically leads his students.
- The teacher should constantly prepare students for real life situations with moral content, which they must then address and provide them with ample opportunities to show the strengths of character. Such behaviour must always be noticed and positively evaluated.
- Teachers and all staff must constantly evaluate the effectiveness of educational programs, and at the same time they should be supported in moral education and training.
- All teachers in all subjects must be involved in education, and character education itself must be properly embedded in the curriculum.
- Character education must be constantly discussed in the teaching staff, new methods and ways should be sought, which would be created about the individual peculiarities of students.

Every educator and youth worker should care about knowing the strengths of the characters of the actors in the educational process themselves. This can help to understand the personality and peculiarities of individual students. This is appropriate to use especially in an individual approach but also as a group in the context of the whole class. Based on the knowledge of SSCH students, the teacher can understand and explain specific phenomena in the classroom and respond promptly to them. As our research has shown in the development and promotion of the supportive climate of the classroom, it is necessary to develop the ability to love and be loved, modesty, reserve, and humility. However, the question arises whether building support and cooperation is important for today's hectic life, or whether it is appropriate to support the self-promotion of students. In our opinion, it is necessary to find a compromise between these two poles. If a person wants to assert himself in today's world, he should be able to show his qualities, be persistent and tenacious, but at the same time it is necessary to realize that man does not live alone but is part of society and a certain community in which he moves. He should therefore respect other people and try to be accepted and mutually supported by members of this community.

Conclusion

In our research study we tried to approach a new psychological direction - positive psychology and its three main pillars, which are positive experiences, positive institutions, and positive individual traits. At the same time, we define the concept of strengths of character and virtue, as part of the last pillar - positive individual traits of man. We briefly characterize virtues and define the term character from the traditional point of view and from the point of view of positive psychology. We determine the strengths of the character, define the criteria intended for the creation of taxonomy and present a complete taxonomy of the strengths of the character. Good character is important in the daily life of the individual and the family, at work, at school and in the whole community. For centuries, the universal goal of education has been to build and strengthen the character among children and adolescents. Character is an important element for lifelong optimal human development. We also pay attention to the concept of class climate and some terminological ambiguities, identify factors of class climate, types of class climate and present several strategies for its improvement. In connection with the moral high school climate, we also mention character education and some programs that support the creation of so-called of "good character". The main goal of the research was to find out what is the relationship of strengths of character to the climate of the class, and which specific aspects have the most significant influence on it. People who are rich in character are popular and have better interpersonal relationships.

This is an important knowledge for education. A good social climate has a great influence on the overall teaching, on the motivation of students to learn, on the final knowledge of students and on their personal life. We believe that the results can be used to improve existing prevention and intervention programs for the positive development of youth. Information can lead to the creation of an effective development program, focused on those sites that are not sufficiently developed in adolescents and children. It is more advantageous for teachers to start working with already developed aspects, which will ensure the motivation of students, and then to move smoothly to other strengths of character. It is important to realize that this requires an open and experienced pedagogical approach. Our research has yielded unexpected results. In the first three places, overall, gratitude was placed in the strengths of character, in the second-place humour and in the third-place curiosity. In the last three places, caution, prudence, initiative, leadership, and perspective ended. The creation of a supportive class climate is mainly influenced by a person's ability to love and be loved. Pupils' creativity and their perseverance or tenacity have the greatest effect on self-persuasion (which is perceived as the opposite of a supportive climate). On the contrary, modesty, restraint and humility have a negative impact.

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Examining the Attitudes of Teacher Candidates towards Teaching as Career and the Reasons Why They Have Chosen the Career

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Abstract

This study was designed to reveal the attitudes of teacher candidates towards the teaching profession and their attitudes towards their preference for the teaching profession and the relationship between these two situations. The sub-problems of the study are to what extent there is a relationship between the attitudes of teachers' attitudes towards the teaching profession and their attitudes towards the teaching profession. The data of the research are based on the results of the researches on the subject. Studies found suitable for the purpose of the research were analyzed by content analysis method. As a result of the research, it is concluded that the teacher candidates are undecided in their attitudes towards their choice of teaching profession, and their attitudes towards the teaching profession are at a positive level.

Keywords: teaching as career, attitude, choice, teacher

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The Influence of a VC-Based Training Course on Pre-Service EFL Teachers' Teaching Strategies: A Case Study of Training Syrian Pre-Service EFL Teachers

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Abstract:

The pressing need for training pre-service English as a Foreign Language (EFL) teachers to teach English through synchronous videoconferencing (VC) courses is heightening due to the authentic foreign language learning opportunities offered by the VC medium concerning the practice of all four L2 skills. This need should be emphasised further by the positive impact of using VC that can potentially bring forth the teaching strategies implemented by EFL teachers. To date, few studies have explored the effects of VC-based training on EFL teachers' teaching strategies. Existing studies examined mainly the effects of the training on in-service EFL teachers' teaching performance rather than on pre-service teachers. Thus, this paper aimed to investigate the effects of the VC-based training on the pre-service teachers' teaching strategies regarding how they teach all four macro L2 skills, vocabulary, and grammar. A case study of VC-based EFL teacher training was conducted with six pre-service Syrian EFL teachers. Data was gathered from a series of observations during the VC-based EFL teacher practicum. Teacher diaries sought to examine the change in the teaching strategies before and after the training. The study findings showed that pre-service EFL teachers could adopt more communicative and student-centred teaching strategies and create a friendly, engaging atmosphere in VC-based EFL classes. Though the study is limited in scope, it explored a context previously unresearched gaining valuable insights.

Keywords: pre-service teacher training, videoconferencing, teacher practicum, language education, student-centred teaching strategies, Syria

1. INTRODUCTION

Most studies acknowledge that effective use of technology in English as a Foreign Language (EFL) classes saves time, facilitates activate engagement, creates personalised learning opportunities, enables self-learning and self-discovery, and enhances motivation to stay in touch with recent technological trends (e.g., Flores, 2015; Taylor et al., 2011). Increased use of videoconferencing (VC) with its potential for breaking the physical limitations of traditional classrooms, increasing students' interaction with their teacher and peers, and ultimately creating a more student-centred environment (Correia & Xu, 2020), has led to a need to train pre-service EFL teachers from Syria to teach in VC-based EFL courses.

Even though few attempts were made to train teachers of English in Syria to start teaching online such as the one supported by the British Council – an asynchronous, online training course for primary school teachers of English (British Council, 2019), existing studies are still scarce. Hence, this current study aimed to design a needs-based, VC-based training course for pre-service EFL teachers and to investigate the effects of the training on the pre-service EFL teachers' strategies teaching English throughout the practicum.

2. LITERATURE REVIEW

2.1. VC-based training course for pre-service EFL teachers

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Many language teaching programmes have been developed to train pre-service teachers how to teach languages via VC-based environments. Such programmes mainly focus on the content and process of the training (Schmitt & Eilderts, 2018; Son, 2018). Among the skills that EFL teachers need to develop throughout the VC-based training course for pre-service EFL teachers is the effective use of tools and features available in the VC-based EFL class, as highlighted in Bax (2003). The content of a VC-based training course for pre-service EFL teachers should involve new language teaching methodologies and strategies and how to integrate technology appropriately into VC-based EFL courses to meet specific language learning/teaching goals (TESOL, 2011). As far as the process element is concerned, a VC-based training course for pre-service EFL teachers should provide pre-service EFL teachers with both formal and informal learning (Son & Windeatt, 2017). Formal learning includes informing teachers of how to implement EFL teaching strategies in the VC-based EFL class and which online interactive tools and features may help them in the process. On the other hand, informal learning includes providing pre-service, VC-based EFL teachers with sufficient opportunities to put their formal knowledge into practice and to evaluate for themselves what works and what does not work in different teaching contexts (Kourieos & Diakou, 2019).

VC-based EFL teacher trainers should first provide pre-service, VC-based EFL teachers with a practicum period for the teachers to start applying the formal knowledge gained in training in their own VC-based EFL classes. In addition, VC-based EFL teacher trainers should encourage pre-service, VC-based EFL teachers to reflect on their teaching by keeping a teaching journal and analysing what worked and what did not work in their teaching throughout their practicum and in their future teaching.

2.2 Design of a VC-based training course for pre-service EFL teachers

The components that a VC-based training course for pre-service EFL teachers should focus on the EFL teaching content, that is, addressing the knowledge and skills EFL teachers should have. This aspect is mainly related to the theoretical knowledge or beliefs that EFL teachers may acquire from theory (Estaji & Dezfoolian, 2018) about second language acquisition and teaching EFL and its skills. Such theories about EFL teaching can be directly provided by VC-based EFL teacher trainers using samples taken from different coursebook materials and supported by opportunities for discussions about how to teach these materials effectively.

A VC-based training course for pre-service EFL teachers should include the process of VC-based EFL teaching, referring to how the knowledge and skills need to be used in VC-based EFL classes (Son, 2018). That entails the VC-based training course for pre-service EFL teachers should allow pre-service teachers to put the EFL teaching theories in practice in the practicum, enabling them to manage their own EFL classes independently and reflect on their teaching (Estaji & Dezfoolian, 2018).

2.3. Approaches for training pre-service EFL teachers how to teach English via a VC-based environment

Research investigating Computer Assisted Language Learning (CALL) and practical, pre-service English language teacher training courses suggest that language teachers learn best when the technologies are integrated fully in the training programme (Bustamante & Moeller, 2013). Therefore, EFL teacher training should be carried out in a VC medium for the pre-service teachers to get hands-on experiences of how VC features and online tools can be integrated fully in EFL teaching. Encouraging pre-service EFL teachers to start an online community and a teacher journal where they can discuss and reflect on their teaching strategies and how they can be taught using VC features and online tools will allow pre-service teachers to use these technologies in their EFL class effectively as they start to teach independently and to understand the underpinning pedagogy (Son, 2018). Such an approach encourages pre-service EFL teachers to take a learning-by-doing approach to their professional development (Son, 2018).

3. THE STUDY

3.1. Aim and research questions

This study aimed to explore the pedagogical effects of the VC-based training course for pre-service EFL teachers on six pre-service EFL teachers' teaching strategies during their practicum.

RQ1 How does the VC-based training course influence pre-service teachers' teaching strategies?

RQ2: How does the use of VC transform the pedagogical environment in EFL contexts?

3.2. Design

This current study was designed as a case study because it studies how theories and concepts of EFL teacher education are illustrated through their application in practical situations (Kelch & Malupa-Kim, 2014). The study aimed to explore the impact of the VC-based EFL teacher training programme on six, pre-service EFL teachers from Syria. The Zoom software program was selected for this case study because of its unique and innovative features to provide professional, VC-based EFL teacher training while integrating best EFL pedagogical practices and using different online tools that help to make VC-based EFL classes more interactive and effective in meeting specified language learning outcomes (Lenkaitis, 2020).

3.3. Participants

Six pre-service EFL teachers (four females and two males) from Syria volunteered to participate in this study. The participants were recruited through convenience sampling (Creswell, 2013) based on their English proficiency level (B1 was considered to be the minimum) and access to high internet speed and a laptop/ computer. Following that, the English proficiency levels of EFL teachers and learners were determined using an online, mobile-based, English placement test designed by the British Council, namely, “English Score”. Pre-service English language teachers who participated in this training had little to no basic EFL teacher training before and no previous VC-based, EFL teacher training. Some pre-service English language teachers had had experience teaching English in their local surroundings, but their EFL teaching strategies were spontaneous and lacked sufficient pedagogical knowledge.

3.3 Procedure

A needs-based VC-based training course for pre-service EFL teachers was designed after inviting the participants to participate in an online interview protocol (see Appendix 1 for the questions asked during the online interviews). Online interviews were recorded and transcribed, and they guided the design of the VC-based training course. The VC-based training course for pre-service EFL teachers was then taught from November 1st, 2020 until December 13th, 2020 (seven weeks). The course included self-paced, asynchronous learning material offered via Google Classroom (see samples in Appendix 2) and synchronous VC-based sessions via Zoom (see samples of the slides used during Zoom sessions in Appendix 3). Pre-service teachers had to fulfil assignments via Google Classroom before and after every Zoom session. Table 1 below illustrates the learning components of the VC-based training course for pre-service EFL teachers.

Table 1: Components of the VC-based training course for pre-service EFL teachers

1 st session	Using different asynchronous and synchronous tools effectively in online English Language Teaching
2 nd session	Teaching reading as a skill online (pre-reading, while reading, and post reading activities, analysing reading activities, online tools to be used, mock lessons)
3 rd session	Teaching listening as a skill online (pre-listening, while listening, and post listening activities, analysing listening activities, online tools to be used, mock lessons)
4 th session	Teaching writing as a skill online (pre-writing, while writing, and post writing activities, making and using rubrics, using checklists and peer feedback, analysing writing activities, online tools to be used, mock lessons)
5 th session	Teaching speaking as a skill online (pre-speaking, while speaking, and post-speaking activities, making and using rubrics, using checklists and peer feedback, analysing speaking activities, online tools to be used, mock lessons)
6 th session	Teaching grammar and vocabulary online (teaching grammar in context, communicative grammar, order of second language acquisition, grammar games/ activities to be used online, steps of teaching grammar using inductive and deductive approaches and controlled and semi-controlled activities, online tools to be used to practice using grammar)
7 th session	Online testing and assessment and designing lesson plans or online activities

VC-based training sessions were held once a week. Every session lasted for two and a half hours, which included pre-service teachers discussing the suggested topics and doing mock lessons for teaching all four macro skills. Pre-service teachers were asked to do a practicum in the final session, which started after a gap of six-weeks. During this gap, the participating pre-service VC-based EFL teachers practised using different online tools such as Google Classroom,

Google Doc, Google Slides, Nearpod, Kahoot, and Quizlet. The practicum lasted for seven weeks, during which each pre-service teacher independently taught a group of learners of a specific English language proficiency. Each created personal Zoom and Google Classroom accounts and used different online features and tools according to what they thought would pedagogically help them reach their course outcomes.

3.4. Data Collection

Observation checklists were designed based on the VC-based training course for pre-service EFL teachers' learning objectives (see Appendix 4). During the practicum, each pre-service teacher was observed twice, and observations were conducted in a random manner without informing the teachers when precisely they would be observed to make sure that they would be prepared and doing their best throughout the practicum. Pre-service teachers' teaching diaries were collected using Google Form (see Appendix 5) after each class and compared with the observation notes and checklists.

An online group interview was conducted with all six pre-service teachers after the practicum using semi-structured questions (Dörnyei, 2007) to examine their perceptions of the VC-based training course for pre-service EFL teachers and their own teaching experience during the practicum.

3.5. Data analysis

After researchers completed the data collection, all collected data (observation reports, teacher diary entries and verbatim transcription of a two-hour group interview) was first transferred to a single Word document. Following that, the researchers analysed the three datasets through open coding. The open coding analytical method (Silverman, 2011) helped the researchers to undertake more detailed coding, which constituted clustering and organising the open codes into broader themes that describe the data. Having undertaken a rigorous analysis of three datasets, the researchers generated five emerging themes (see Table 2).

Table 2: Emerging themes

Theme	Definition
(1) Technology enhanced teaching	<ul style="list-style-type: none"> Pre-service teachers gained familiarity with implementing online tools (e.g., Kahoot, Voice Thread, Quizlet, Google form) to make their teaching more interactive, engaging, and student-centred.
(2) Effective use of online pair and group work activities	<ul style="list-style-type: none"> Pre-service teachers developed awareness of how to use pair and group work activities effectively.
(3) Online feedback	<ul style="list-style-type: none"> Online feedback means feedback is first provided by peers and then is provided by the teacher. Pre-service teachers gained knowledge and understanding of how to use peer assessment in their teaching practicum. Pre-service teachers learnt how to create and use rubrics for peer assessment. Students can receive immediate and constructive feedback from the pre-service teachers.
(4) Intermittent presence of teachers	<ul style="list-style-type: none"> Pre-service teachers reduced their teacher talking time in their teaching and promoted personalised learning. Pre-service teachers used semi-controlled activities, which means offering opportunities for practice and use.
(5) VC transformative pedagogical space	<ul style="list-style-type: none"> Pre-service teachers created a friendly and non-threatening atmosphere which contributed positive wellbeing during classes. Pre-service teachers created engaging and fun activities for students.

4. FINDINGS

This section presents the preliminary findings based on the analysed data from observation reports, teacher diaries, and group interviews. Findings are shown here in Table 3.

Table 3: Findings related to emerging themes

Theme 1: Technology enhanced teaching	
<i>Observation reports</i>	After the second observation, the majority of the pre-service teachers gained confidence in using multiple online interactive tools such as Kahoot, GoogleDocs, Google form, and Quizlet in their teaching practices.
<i>Teacher diaries</i>	Pre-service teachers reported that they used multiple online interactive tools such as Kahoot, Google form, Quizlet, etc. to engage students in vocabulary and grammar practice.
<i>Group interview</i>	Pre-service teachers recounted that using online interactive tools such as Kahoot, Google form, Quizlet, etc., helped engaging students in different activities and offered opportunities for vocabulary and grammar practice.
Theme 2: Effective use of online pair and group work activities	
<i>Observation reports</i>	Pre-service teachers discovered that online tools are motivating and engaging for students. They offered a more-personalised approach for teaching and allowed all students to participate in different class activities.
<i>Teacher diaries</i>	Pre-service teachers reported that they used breakout rooms for pair or small discussions allowed all students to practise and develop their English skills.
<i>Group interview</i>	Pre-service teachers found the use of these online tools motivating and engaging for students. They offered a more-personalized approach for teaching and allowed all students to participate in different class activities.
Theme 3: Online feedback	
<i>Observation reports</i>	It has been observed that the pre-service teachers found peer feedback guided by rubrics and checklists effective in familiarising the students with how they are assessed by the teacher and helped them to improve their English language skills.
<i>Teacher diaries</i>	As explained by most of the pre-service teachers, they provided students with opportunities to receive peer feedback as they allowed students to participate in different collaborative activities. This helped the students gain confidence and improved their English language use. Using rubrics helped guiding students into how to give peer feedback and encouraged them to be more autonomous in learning.
<i>Group interview</i>	Pre-service teachers found that allowing peer feedback guided by rubrics and checklists very effective in familiarising the students of how they are going to be assessed by the teacher later and helped them improve their English language skills.
Theme 4: Intermittent presence of teachers	
<i>Observation reports</i>	Pre-service teachers' role in class has changed to become more of a facilitator as they guided students and gave them more opportunities to use the language in class and improve their skills.
<i>Teacher diaries</i>	Pre-service teachers were able to decrease their talking time and allow students more opportunities to use the language while they explore how language is being used in context and discuss and provide feedback to each other using answer keys and rubrics.
<i>Group interview</i>	Pre-service teachers' role in class has changed to become more of a facilitator as they guided students and gave them more opportunities to use the language in class and to improve their skills.
Theme 5: VC transformative pedagogical space	
<i>Observation reports</i>	Pre-service teachers created a friendly and comfortable environment for the learners. Most students were observed that they could ask questions to their teachers without any difficulty or hesitation.

<i>Teacher diaries</i>	The pre-service teachers created a friendly, engaging environment where students can take part in different class activities and ask questions.
<i>Group interview</i>	The pre-service teachers learned what activities to use to engage all students in the class and motivate them to discuss their ideas freely. Pre-service teachers created a friendly atmosphere where students can work independently and collaboratively with their peers.

5. DISCUSSION

The data collected from the practicum’s observation reports, teacher diaries, and teachers’ group interview shows the effects of the VC-based training on pre-service teachers’ teaching strategies throughout the practicum. These effects can be categorised into the following five themes:

5.1. Technology-enhanced teaching

Pre-service EFL teachers started using online tools they were trained to use throughout the VC-based training course. Having practised using these online tools during the training encouraged them to use the tools in their classes through the practicum. Such results were also suggested by Bax (2003) as he mentioned that practical teacher training starts with teachers experimenting and gaining confidence in the use of newly-introduced technologies. The use of these online tools helped the pre-service EFL teachers make learning more personalised and student-centred. Similar findings were reported suggesting the effective use of online tools in the VC medium can increase students’ interaction with their teacher and peers and ultimately create a more student-centred environment (Correia & Xu, 2020).

5.2. Effective use of online pair and group work activities

Pre-service EFL teachers showed multiple instances of implementing effective pair and group work activities during the practicum. They recognised the importance of using pair and group work activities to develop learners’ English language skills throughout the VC-based training course and learned about the VC features that allow for such activities. The VC-based training course for pre-service EFL teachers helped equip pre-service EFL teachers with the knowledge and experience of how EFL teaching pedagogies can be implemented in VC-based EFL classes. The training included opportunities for teachers to perform mock lessons before they are asked to teach independently through the practicum. Similar findings were identified by Kelch and Malupa-Kim (2014), who also emphasised the importance of informal, practical training that goes along with the formal theoretical one.

5.3. Online feedback

Pre-service EFL teachers were able to offer students opportunities where they can give each other effective feedback. They showed instances of creating rubrics and checklists and guiding students to use them effectively as they provide feedback to each other in different speaking and writing activities. That shows how the VC-based training course equipped the pre-service EFL teachers with the practical knowledge of EFL pedagogy and how to implement it effectively online to encourage learners to be more autonomous.

5.4. Intermittent presence of teachers

Pre-service EFL teachers could decrease their teacher talking time while allowing more time for students to discuss in pairs or groups how language is being used in context and talk about different topics. Therefore, the role of the teacher has become more of a facilitator of the learning process. Pre-service EFL teachers learned how to create several online activities that guide students’ English language learning and engage them in the class.

5.5. VC transformative pedagogical space

Pre-service EFL teachers were able to create a friendly engaging learning environment where all students can participate in different class activities and give peer feedback to each other. Similar findings were observed in Selcuk’s (2017) study as the online learning environment helped the students feel comfortable with each other when undertaking class activities and develop friendship among the group partners.

6. CONCLUSION

Even though the study is promising, it is small in scope as only six pre-service EFL teachers. It lacks robust research design since professional development of the participating pre-service EFL teachers can occur outside the training and may differ depending on different affective factors which may not relate to the training design. Future studies will investigate pre-service VC-based EFL teacher training with more rigorous research designs and a greater sample size. The study also sheds light on the importance of training pre-service EFL teachers in developing countries (such as Syria) to use VC tools as they can offer promising potential for creating interactive, student-centred, language learning contexts that might be difficult to develop in face-to-face settings.

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Appendices

Appendix 1: Guiding interview questions for designing the teacher training course

- 1- What do you know about videoconferencing tools and their potentials in English language teaching?
- 2- What online tools do you think can help learners develop their English language skills? How can they be integrated in a video-conferencing EFL teaching course?
- 3- How do you teach reading as one of the EFL skills? What online tools can help you in this concern in the video-conferencing-based EFL teaching course?
- 4- How do you teach writing as one of the EFL skills?
- 5- What online tools can help you in this concern in the video-conferencing-based EFL teaching course?
- 6- How do you teach speaking as one of the EFL skills? What online tools can help you in this concern in the video-conferencing-based EFL teaching course?
- 7- How do you teach writing as one of the EFL skills? What online tools can help you in this concern in the video-conferencing-based EFL teaching course?
- 8- How do you teach grammar and vocabulary as important components of EFL teaching?
- 9- What online tools can help you in this concern in the video-conferencing-based EFL teaching course?
- 10- What do you want to learn in video-conferencing-based EFL teacher training course?

Appendix 2: sample of asynchronous assignments delivered with Google Classroom

<p>Teaching Speaking (two-way communication)</p> <p>* Required</p>	<p>Watch this video: https://www.youtube.com/watch?v=Lf7zs28fi64&fbclid=IwAR39cNh7puLk7PJFkjJL_lO-NedzHpptB44JgjbJ7Wee2f1boFDZyww and explain the importance of having a stress free class for students to speak? How can teachers create such a relaxing atmosphere for students? *</p> <p>Your answer</p>
<p>Name *</p> <p>Your answer</p>	<p>Speaking activities usually aim at developing fluency, accuracy, or both? what is the difference? Use Google to find the difference *</p> <p>Your answer</p>
<p>Watch this video: https://www.youtube.com/watch?v=-K8MeTUS_BM&fbclid=IwAR1bW5zuE9RZ4awJyVIDPOLCBirOe93oUUUw-EUj_cPW-hu98imj59_uj9E. What are the challenges that students face as they learn to speak English? *</p> <p>Your answer</p>	<p>How can we avoid using mother tongue when teaching beginners' courses? *</p> <p>Your answer</p>
<p>What are the steps of teaching speaking? *</p>	<p>If we have a certain model (dialogue) to use, we move from controlled activities where they practice certain language structures to semi controlled activities. Give examples of both activities. *</p> <p>Your answer</p>
<p>Is asking students to read or memorize dialogues going to help them improve their English speaking skills? What should we do instead?</p> <p>Your answer</p>	<p>How can we make the task of speaking easy for the students? *</p> <p>Your answer</p>
<p>What is the function of giving students a framework that consists of guiding questions? *</p> <p>Your answer</p>	<p>Watch this video: https://www.youtube.com/watch?v=iSr8koU1iHY&fbclid=IwAR04hOHRrAaeUrNGuCnmt7gZ9UrKZBNQwBjapggO9c0iyRwsEUcnYLYdEc. What activities can you use online?</p> <p>Your answer</p>
<p>How would using the three stages in teaching speaking help students? *</p>	

Appendix 3 Slides from the training

What are the types of speaking? What are the things to consider in teaching each type? Why do you think our students in Syria have so many problems in speaking?

- One way speaking (organization include opinion + reason 1+ example reason 2+ Ex.

Conclusion

- Two way speaking (discourse management / interactive communication) grammar + vocabulary (both)

Knowing what to consider will help you making the rubric which will help you assess your students performance.

- Discourse management: Are your ideas expressed in clear and well-organised language? Are you using a range of language to link and organise your ideas? Are you able to speak fluently, without too much hesitation?
- Interactive Communication: Are you able to interact with the other candidate easily and effectively? Are you listening to the other candidate and answering in a way that makes sense? Are you able to start a discussion and help manage the discussion so that you and your partner keep it going

Levels of proficiency / Categories	EXEMPLARY	LEARNED	BASIC	APPRENTICE
LANGUAGE	No problems in grammar or vocabulary. Highly effective and understandable message	Few problems in grammar and vocabulary. Non effectiveness in the message	Many problems observed in grammar and vocabulary that leads listener to misunderstandings	Many problems observed in grammar and vocabulary that leads listener to misunderstandings
ORGANIZATION	Easy to get the ideas. The speaker gives alternative options to be understood. The message is completely understandable	Not many difficulties to get the ideas. The message is most of the times understandable	Difficulties to get the ideas. The message need to be guessed from other source but not the actual production	Many problems observed that make the message be understandable
CONTENT	The speaker provides content with the appropriate information to be understood. He/She says almost all words connected to the topic	The speaker provides content enough to be understood. He/She says many words connected to the topic	The speaker does not provide content enough to be understood. He/She says few words connected to the topic	The speaker faces many troubles to communicate the ideas. He/She says almost nothing
PRONUNCIATION	Highly affective intonation. Proficient word stressing and word linking. Distinctive and audible sounds produced	Slight problems in intonation. Word stressing usually unclear. Word sounds with slight problems	Some problems in intonation. Word stressing sometimes unclear. Word sounds with lots of problems	Serious problems with intonation. Amateurish word stressing and word linking. Awkward sounds produced

criteria	1	2	3	4	5
Language	wrong				All correct
organization	wrong				Ideas run smoothly
content	wrong				Answers the required content
pronunciation	Wrong digression				

criteria	1	2	3	4
Discourse management	wrong			
Interactive communication	wrong			
Grammar	wrong			
Vocabulary	Wrong			
Pronunciation				

Appendix 4: Observation Checklist

Observation Checklist

Teacher's name: _____ Date: _____

Skills the teacher targeted in this class: _____

<i>Category</i>	<i>Response</i>			<i>Comments</i>
General impressions about the online class	Yes	No	N/A	
Topic(s) discussed in class				
Tools used				
Activities implemented in class				
Challenges the teachers faced				
Reasons for these challenges/ barriers				
Teaching reading online	Yes	No	N/A	
Effective use of pre-reading tasks				
Effective use of while-reading tasks				
Effective use of post-reading tasks				
Students have a clear purpose for reading				
The teacher effectively uses online features and tools (breakout rooms/ chat box, share screen) effectively to facilitate student learning during the reading task				
Teaching listening online				
Effective use of pre-listening tasks				
Effective use of while-listening tasks				
Effective use of post-listening tasks				
Students have a clear purpose for listening				
The teacher effectively uses online features and tools (breakout rooms/ chat box, share screen with audio) effectively to facilitate student learning during the listening task				

Teaching writing online				
Effective use of pre-writing tasks				
Effective use of while-writing tasks				
Effective use of rubrics				
Students have a clear purpose for writing				
Students have a model to follow for writing				
The teacher effectively uses online features and tools (Google Doc/ breakout rooms/ chat box/ blogger) effectively to facilitate students' performance while they do the writing task				
Teaching speaking online				
Effective use of pre-speaking tasks				
Effective use of while-speaking tasks				
Effective use of rubrics				
Students have a clear purpose for speaking				
Students have a model to follow for speaking				
The teacher effectively uses online features and tools (Google Doc/ breakout rooms/ chat box/ blogger) effectively to facilitate students' performance while they do the speaking task				
Teaching vocabulary and Grammar				
Teacher introduces vocabulary and grammar in context				
Teacher uses both inductive and deductive ways of teaching grammar				
Teacher uses controlled and semi controlled activities to allow students to use the main grammar and vocabulary items introduced in the course				
Teacher uses online features and tools to make grammar and vocabulary practice fun and interactive for students				
Active and Engaged Learning				
Answers/ poses student questions clearly and purposefully in group class discussions to engage learners in the learning process				

Allows students time to process and answer questions			
Creates an interactive learning environment that welcome, challenge, motivate, and support all students			
Demonstrates effective pedagogies for engaged EFL learning			

Additional Comments:

A. Things that went well for the instructor in the online class:

B. Challenges in this particular online class:

C. Specific suggestions for enhancing this online teaching- learning class:

Appendix 5: Sample of teacher diaries

Weekly teacher journal Class 1 <small>* Required</small>	What skills did you teach in today's class? *	Is there anything that you wish you did differently in today's class? please Explain in details * Your answer _____	
Name of the teacher+ week number (Example: Lillian 1 which means that it is the first week) *	<input type="checkbox"/> Reading		How would you improve your teaching in the next class? * Your answer _____
Your answer _____	<input type="checkbox"/> Writing		
How was the class today? How did you feel about it? *	<input type="checkbox"/> Speaking		What did you learn from your class today concerning teaching strategies and online class management skills, etc? * Your answer _____
Your answer _____	<input type="checkbox"/> Listening		
What went well in the class? *	<input type="checkbox"/> grammar		Submit <small>Never submit passwords through Google Forms.</small>
Your answer _____	<input type="checkbox"/> vocabulary		
What did you enjoy in today's class? *	If you taught READING, how did you do that? What online tool did you use? Were there any problems? *		
Your answer _____	Your answer _____		
What didn't go well? why? *	If you taught WRITING, how did you do that? What online tool did you use? Were there any problems? *		
Your answer _____	Your answer _____		
How do you think you can improve your teaching strategies and class management better so that your coming classes will be better? *	If you taught LISTENING, how did you do that? What online tool did you use? Were there any problems? *		
Your answer _____	Your answer _____		
	If you taught SPEAKING, how did you do that? What online tool did you use? Were there any problems? *		
	Your answer _____		
	If you taught GRAMMAR, how did you do that? What online tool did you use? Were there any problems? *		
	Your answer _____		

Foreign Language Learning Anxiety among EFL Undergraduate Students in China

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Abstract

This study examined the foreign language learning anxiety level among 120 EFL undergraduate students in China. It also examined the relationship between the students' foreign language learning anxiety and their English achievement. The research instrument used in this study was the Foreign Language Classroom Anxiety Scales (FLCAS). Quantitative method is employed in this study. The results shows that the level of the students' foreign language learning anxiety was moderate. In addition, there was a significant relationship between the students' foreign language learning anxiety and English achievement.

Keywords: Foreign language learning anxiety, FLCAS, EFL students, English achievement

1. INTRODUCTION

1.1. Background

In recent years, learning English has been given more emphasis in China and more people have been attracted to learn the English language. According to a 2018 China Daily article, the number of English learners in China is around 400 million, approximately one third of China's population. Moreover, the English course called College English in China is required for almost all students of universities and colleges, according to the College English Curriculum Requirements issued by the Chinese Minister of Education (2007). Data published by the Ministry of Education of China indicates that the number of Chinese college students was 37 million in 2020, which means these students all need to learn English as a foreign language. Although students have a great deal of experience in learning English, there are still some students who are afraid to use English in their daily lives and their studies.

Anxiety is one of the affective variables that have been found to affect foreign language acquisition and performance (Tallon, 2009). Anxiety can be both debilitating and facilitating. William's research has demonstrated that moderate anxiety is beneficial to foreign language learning, as it can keep learners in a moderate state of tension and focus. However, both low anxiety and excessive anxiety are not conducive to foreign language learning (William, 1981). The typical external responses of foreign language learning anxiety can be regarded as general symptoms of anxiety, such as the learner experiencing palms sweating and a rapid pulse. Further symptoms might manifest, such as when standing up and answering questions, experiencing a feeling of freezing or even saying nothing, just keeping silent. In addition, some more serious symptoms might manifest, such as avoiding eye contact with the teacher or even skipping class and giving up on learning English.

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It is necessary to have a better understanding of foreign language learning anxiety, and there has been little research on this topic in China. Therefore, this study will investigate the foreign language learning anxiety experienced by Chinese undergraduate students and will examine the relationship between foreign language learning anxiety and learning achievement.

1.2 Objectives of the study

1. To investigate the level of foreign language learning anxiety among Chinese EFL undergraduate students.
2. To investigate the relationship between foreign language learning anxiety and English learning achievement

2. Research Methodology

2.1 Participants

The participants in the study were 120 Chinese undergraduate students who were majoring in English, and they were selected by using simple random sampling. Their participation is voluntary.

2.2 Research instrument

The main research tool for this study was a questionnaire. The questionnaire consisted of two parts. The first part of the questionnaire included the participants' personal information, such as their learning experience and English Grade Point Average (GPA). In the second part, the researcher used the Chinese version of Foreign Language Classroom Anxiety Scales (FLCAS) to assess participants' foreign language learning anxiety. The FLCAS, which was originally constructed in English, needs to be translated into Chinese, so that Chinese learners have no difficulty understanding the statements on the scale. Dörnyei (2010) remarked that special attention should be given to the translation of the original scale, to enhance its usefulness as a research tool. Therefore, this study use the Chinese version of the FLCAS. The test was developed by Horwitz (1986) and consists of a 33-item, five-point Likert scale questionnaire. The test assesses three types of foreign language anxiety: communication apprehension, test anxiety, and fear of negative evaluation. Of the total number of items, thirteen items assess communication anxiety (numbers 1, 3, 4, 9, 13, 14, 18, 20, 24, 27, 29, 32, and 33). Three items (numbers 8, 10, and 21) assess the degree of anxiety when respondents take tests. In respect of fear of negative evaluation, six items (numbers 2, 7, 15, 19, 23, and 31) measure the anxiety related to criticism and poor scores in their foreign language learning tasks. The answers were measured using five- point Likert scales, namely: strongly agree (5), agree (4), neither agree nor disagree (3), disagree (2), and strongly disagree (1). Possible scores on the FLCAS range from 33 to 165. The higher the score, the higher the level of foreign language learning anxiety experienced. The researcher indicated average score from the questionnaire scores, 1.00-1.50 means no anxiety or very little anxiety; 1.51-2.50 means little anxiety; 2.51-3.50 means moderate anxiety; 3.51-4.50 means high anxiety and 4.51-5.00 means strongly high anxiety.

2.3 Data analysis

This study used quantitative analysis. The mean and standard deviation (SD) were used to examine the level of foreign language learning anxiety of Chinese undergraduate students. Pearson's Correlation Coefficient was used to analyze the correlation between the foreign language learning anxiety and the English learning achievement.

3. Findings

As previously stated, the objectives of this study were to investigate the level of foreign language learning anxiety among Chinese EFL undergraduate students and to examine the relationship between foreign language learning anxiety and English achievement. Through the collection and analysis of the data, the results as following:

Table 1 the level of student's foreign language learning anxiety

Types of anxiety	Mean	Std. Deviation	Anxiety level
Communication Apprehension	3.18	.44	moderate
Test anxiety	2.74	.61	moderate
Fear of negative evaluation	3.13	.62	moderate
Overall	3.08	.39	moderate

It can be seen in Table 1 that the students' foreign language learning anxiety was at a moderate level, and all three types of foreign language learning anxiety were at the moderate level. Considering in each types of foreign language learning anxiety, Communication apprehension got the highest average score, while the test anxiety got the lowest average score.

Table 2 Correlation between FLCAS scores and English GPA scores

	GPA of English	Communication Apprehension	Test anxiety	Fear of negative evaluation	Anxiety (overall)
GPA of English	1				
Communication Apprehension	-.431**	1			
Test anxiety	-.416**	.360**	1		
Fear of negative evaluation	-.373**	.702**	.455**	1	
Anxiety (overall)	-.517**	.886**	.606**	.850**	1

It can be seen in Table 2, there is a negative correlation between students' overall scores of foreign language learning anxiety and their English achievement scores. That means the higher level of foreign language learning anxiety these students have, the more likely they receive lower scores in the English achievement. Considering each type of the foreign language learning anxiety: communication apprehension, test anxiety, fear of negative evaluation has a negatively relationship with the English achievement.

4. Conclusion

This study examine the level of foreign language learning anxiety among Chinese EFL undergraduate students and reveal the relationship between foreign language learning anxiety and English achievement. The results show that the level of foreign language learning anxiety of Chinese EFL undergraduate students was moderate, in addition, there was a negative relationship between foreign language learning anxiety and English achievement. That means the lower of the level of foreign language learning anxiety, the better English achievement students can get.

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Social Emotional Learning: A Discourse for the Times

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Abstract

Social Emotional Learning (SEL) has risen up the educational agenda in recent years but is now considered as crucial given the problems brought about by school closures during the COVID-19 pandemic. This paper considers SEL as part of a wider historical process in which children are encouraged to voice what they think and feel, with this being considered taken as a key aspect of their development. In so doing children learn how to display their agency and how to talk in psychological terms such how they think and feel about what they learn or other matters. Talking is a key aspect through which children learn to engage in various actions as well as the normative ways of connecting emotions with what is learned, both formally in school as well as informally through their immersion within society. In summary, the paper therefore offers a thought piece or critical commentary on SEL as a discourse both of, and for, the times.

Keywords: social, emotional, learning, discourse, childhood, schooling

1. INTRODUCTION

Emotions can be considered as fundamental to thinking and learning. In this regard, Hawkins (2017) points out that, ‘We can create situations which encourage emotional and physical feelings, stimulating learners to discover and re-construct their knowledge’ (p. 151). The school is seen as having a crucial part to play in the development of Social Emotional Learning (SEL) among children (Zins et al., 2007). SEL is considered in terms of being aware of self and others, of understanding one’s own emotions and managing them, and harnessing them in the learning process. It has been associated with academic achievement (Denham & Brown, 2010) as well as the ability to engage in analytical communication and working collaboratively with others (Weissberg et al., 2015). Research has found that students engaging in SEL showed have enhanced classroom behaviour as well as the ability to cope better with stress (Durlak et al., 2011; Taylor et al., 2017).

SEL is also considered as a crucial, not only for children’s development and well-being but also their teachers’ in order to meet the challenges of a world of complex conditions (Jones and Bouffard 2012). However, the COVID-19 pandemic has brought unprecedented challenges in which school closures have led to a greater focus on online learning in which SEL is operationally much more difficult for teachers to encourage and enable. Now that schools are opening up again in many counties, SEL is perhaps more important than ever (Hadar et al., 2020; Kim et al., 2021). However, in order to understand the importance of SEL there needs to much more of an understanding of its broader historical and ideological context.

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2. SEL in historical context

The study of childhood has been mainly limited in social sciences to the study of cognitive and emotional development in psychology, and the processes of institutional socialization in sociology. Much this work has considered the way in which children pass through stages on their way to maturity as an adult. Both approaches have examined how children learn and develop through interaction with adults and as such how their visibility as a distinct social category has become a matter to be attended to. It is worth noting that in Aries (1965) classical work, *Centuries of Childhood*, that the notion of childhood in medieval society did not exist and that to all intent and purposes children as a distinct social category were ‘invisible’. Aries argues the ‘child’ in effect became part of the adult world soon after infancy with no attempt to delineate age or physical maturity. However, Pollock (1983) argues that the claim that the status of childhood did not emerge until the seventeenth century can be contested and that the child was not simply integrated into adult life. Jenks (1996; 2005) has shown how Western concept of childhood is culture-specific and has evolved, and still is evolving, over time. For example, Rousseau’s *Emile* of the early nineteenth century presents an image of childhood which pre-dates modern developmental psychology by arguing that this period of life involves a distinct way of perceiving, thinking, and feeling. This hint of a kind of unfolding maturational process is open to potential damage if it is not nurtured adequately. We see the vestiges of this view of childhood today in which childhood is regarded as a natural state and stage of being, and one that requires to be protected from any kind of damage. It is therefore easy to see why the COVID-19 pandemic and the consequent toll on children’s emotional development can be seen as a matter of concern.

This demarcation of childhood as a distinct state and stage was further enshrined through the separation of the child from work, the provision of state education and a raft of health and welfare provision. By the mid-twentieth century childhood had become a distinct stage of life associated with the notion of moral and psychological development and a burgeoning child-rearing and family advice literature soon followed. This literature comprising academic and populist books and articles has promoted a discourse built around the ‘needs’ of the child thus furthering the notion of childhood. Much of this literature prescribes the means by which these needs can be met such as to allow children to grow and thrive as if part of a natural aspect of the life cycle. Much of these ideas stem from developmental psychology, and in particular the work of Piaget who suggested stages of intellectual growth with each stage developing out of an incorporating the previous one.

Jenks (1996; 2005) regards this age-and-stage approach as being in keeping with the frame of reference of modernity through which the child only comes to know the adult world in a gradual manner. This stage of life is therefore accorded considerable weight in terms of the total life experience and one that called for attention to be paid by adults to the children’s developing cognitive and affective development. Jenks also points out how childhood has become associated with material provision and that this is taken to be natural and grounded in an ideology of care guided by emotional discourse. It is a culture in which adults are expected to act in the child’s interests in which this ideology of care has come to legitimate the economic and cultural capital invested in the promise of childhood. Jenks refers to this as ‘futurity’, a discourse of caring, enabling and facilitating children to become morally well-adjusted adults.

Jenks brings his analysis of childhood into the world of today and argues that mass education and patterns of consumption have shortened childhood and undermined it. He sees it becoming increasingly difficult the child to build a sense of identity as part of a reflexive self. It is therefore in this context that SEL has gained traction as an ideological discourse in which children need to be actively helped to develop a sense of their own identity. Children are increasingly considered in terms of their ability to voice what they think and feel and to negotiate their way through childhood by adopting certain ways of talking. They are aided in this by the school and other adults who encourage them to adopt psychological discourses as ways of accounting for themselves and in asserting their agency. It is through this way of talking that children learn to become accountable moral agents in the world, expected to express ‘thoughts’, ‘opinions’, ‘views’ and ‘feelings’. Thus, we live in an age in which children are actively encouraged to be consulted, and to speak on a number of issues that would have previously been the preserve of the adult world.

3. Talking Children

One of the most important things that children must learn is to make themselves ‘visible’ as agents the world. Perhaps one of the key aspects of childhood today is the extent to which children are part of age of discourse. This can be characterized in two ways; firstly, as a feature of the today’s concern with ‘communication’ and secondly as related to Jenks’s point about the erosion of the boundary between adulthood and childhood in terms of self-expression. Children are expected to have their say, to be consulted and to be listened to. However, they have to be guided in this process by adults in order to produce the kinds of psychological discourse required. This is often accomplished through prompting children to talk about their understanding of the world and how they feel about matters, including in the world of formal schooling.

Childhood has therefore become a site for discourses concerning issues of stability, integration, and social bonds (Hunt (2005). Much of this is focused around the view that children need to acquire conversational skills, that adults need to talk to them more and that children need to be ‘free’ of pressures so that they can simply be children. As noted above there is a concern that children’s psychological growth has been stunted by a lack of interactional and conversational opportunities due to the COVID-19 pandemic. The move to online learning and lack of face-to-face opportunities for children to interact with one another has led to a concern that they may be unable to develop adequately in terms of SEL (Hadar et al., 2020; Kim et al., 2021).

Childhood as psychological ‘development’ is therefore very much in evidence in contemporary discussions about the effects of the pandemic. In this view, learning to converse is linked to the idea that talk functions as a forward-referenced means of moving the child along towards well-adjusted adulthood. The way children talk therefore gets treated as an index of the developmental stage they are at, both in terms of cognitive and emotional development. As Edwards (1997:38) points out with respect to infant cognition, this is largely a post hoc enterprise with an idealized model of adult cognition as the ‘end point’ and a linear path drawn towards how the child reaches this point. The presence or absence of some form of reasoning is taken as indicting how far along the developmental path the child has travelled. Much the same kind of argument can be made with respect to children’s conversational skills. These are often taken as ‘language development’ because of what comes later. The visibility of children in relation to how they talk is read into normative expectancies with respect to chronological age and how far a child has advanced along the adult-child continuum of conversational competency. Likewise, children are now expected to cope with an increasingly complex world in which competencies associated with SEL are considered as crucial to their ability to cope with such complexity (see e.g., Laukkonen et al., 2019).

4. The Socialization Problem

Edwards (1997:296) points out that the learnability of discursive and other cultural practices follows from their visibility and public nature. In other words, children learn ways of talking, a psychological discourse that can be acquired through participation in public practices. Sacks (1972, 1992) referred to this as the socialization problem, that is, how new members learn to take part in a reflexive manner by virtue of taking part. In this way children learn how to project their agency and competency towards becoming an adult through the adoption of this kind of discourse. Sacks considered this as a designed to be acquirable ‘visible’ feature of conversational competence such that the vocabularies of motive could be utilized and subverted. Thus, he notes how accountable actions can be characterized as an inevitable direct causation or can be more loosely and indirectly associated with an action. Sacks notes how parents can subvert the latter by turning it into a matter of the former (e.g. a punishment that inevitably follows a misdemeanor by the child). He also notes how children can learn which aspects of their behaviour are visible as evidence for their prior intention and actions and how they can subvert this by producing such behaviour to elicit these reactions. Thus, the inferential visibility of moral conduct is something that children learn in terms of seeing matters and talking about them.

This is a very different treatment of socialization than Mead’s (1934) account and later refinements by Denzin (1977) and Shibutani (1955). In these accounts of socialization children acquire a sense of self through interactions with significant others and pass through various stages on their way to becoming a person-in-society. For Mead this involved three stages that culminates in the child’s ability to learn the expectations and moral prescriptions bound up

with the various roles they play in society. The later refinements by Denzin and Shibusaki considered issues of interactional age and reference groups respectively on this process. However, despite these modifications there is still the tendency to consider socialization as a process in which children acquire a distinct psychological sense of self and this has become the core ‘problem’ to be examined. Even sociologists who may have a more direct connection with sociolinguistics such as Bourdieu (1977; 1992) posit such a view by referring to a theorization of habitus that trades on an unreflexive mentalist account of development. This presupposes the development of a psychological system in which dispositions associated with membership of social and cultural groups come to generate practices, perceptions, and attitudes. This system is then able to produce ‘meaning’ (i.e. make sense), store and process it. Now whilst Bourdieu gives more weight to sociolinguistic practices and culture, he cannot rid himself of this ‘inner/outer’ dualism and the reification of the child developing as a person in terms of a ‘mind’ that functions as a perceptual system. The point here is that the ‘problem’ is reduced to one of a theory of mind rather than an examination of sociolinguistic practices and how these are learned as practices.

Social actors during conversation treat one another as agents based on the assumption that talk is under voluntary control, and that as such what is said is treated as a morally accountable. These cultural-discursive practices are therefore a feature of childhood that is learnable by virtue of this engagement in discursive psychology. These psychological representations provide the means for a varied way of engaging in social and institutional life and a means of making it intelligible and orderly. Cognitive references to ‘thinking’, giving ‘reasons’, ‘knowing’ ‘interpreting’ or ‘understanding’ provide publicly accountable criteria for agency. This provides a set operational moves that can be applied as a resource for agency and its accountability. Take for example, the references to “thinking things through” or “thinking before acting”. These provide yardsticks for agency with respect to various discursive activities such as making ‘decisions’ and how far children are along the adult-child continuum in terms of their maturity of thought.

Cognition is regarded as the element of control and providing a basis for thinking before acting. The affective or emotional element is taken being spontaneous and representing ‘feelings’ that in terms nonetheless can be taken as an accountable basis for action within conversation. The emotional basis for action that can be presented as understandable, as a means for literally moving a person to do something, or indeed for inaction. It is often portrayed as an influence on how people think, where thinking is taken as reasoning and emotion as providing a means of supporting this as in terms of action or as something that skews or bypasses the reasoning process. Reason implies stability and order in how people conduct themselves; unchecked emotion can be seen as threatening in terms of association with lack of order.

This duality is interesting in terms of the ways in which the discursive usage of emotion terms can be a flexible and useful means of characterizing action. Again, how far children are able to deploy this range of flexibility in practice is taken as being how developed they are as persons. As Edwards (1997) notes emotion discourse can be put to a great variety of uses within a range of social practices due to their flexibility as an accounting resource:

- (i) They can be contrasted with cognitions in terms of their less deliberative nature.
- (ii) They can be taken as being as ‘understandable’ and appropriate as how any reasonable person would react.
- (iii) They can be characterized as being the outcome of events or in the nature of the person.
- (iv) They can be treated as being kept under the control of a person’s reasoning or as reactions that resist control.
- (v) They can be presented as the interaction of mental and physiological systems, as natural, or as derived from moral and ethical concerns.

The ‘socialization problem’ here is in how children learn these sorts of contrastive ways of using emotion talk across a range of social practices and their normative associations. Studying how children deploy these ways of talking, either in terms of direct psychological accounting, or in terms of orientating towards aspects of an inner/outer dualism can be taken as a way of exploring their socialization into a usage of a major cultural dualism: taking people’s ‘outward’ accounts and actions and considering these as representations of what they are like ‘inside’ as thinking and feeling agents. I want to stress that this derives from accountability within conversational practices rather than as the result of some sort of inner mental processing and exchange of representations between interlocutors.

Children therefore need to learn how to ‘talk the psychological talk’ as part of the social practices that they engage in, and of course they learn this by virtue of their interaction with adults and other children. It is something that is a tacit understanding within conversation in terms of how they portray individual attitudes, beliefs, motives, goals, judgements etc. Notice here that orientating to something does not necessarily involve an explicit mention of these psychological terms but rather how people treat each other as if these are germane or at stake. In effect, this orientation is one of a conversational set of discourses that refer to an intra-psyche world. This is something that is normatively attended to as a means of accomplishing order within conversation. It is this that children learn, ways of talking as a means for accomplishing actions in the world.

This cultural-discursive practice is founded upon an orientation of interlocutors as employing a discourse of mental processes in order to account for how they perceive matters and as the basis for action. In this way events are placed prior to this operation, as having happened and needing to be communicated, to be ‘understood’ in terms of an emotional response. In this communication model of conversation there is a realm of people placed in amongst events and occurrences and a realm of mental operations requiring to be brought together. Here rationality is associated with the psychological notion of ‘perception’. Accounts of, and about, actions are presented as part of texts of ‘meaning’ in which a mental processing system is assumed to be brought to bear upon matters in order to display these as the result of psychological agents who reach ‘decisions’, have feelings, have deliberated on something or other or who have can account for something in a way that ‘make sense’ to others who can understand a course of action. It is interesting to note here how even ‘emotion talk’ as the basis for actions may nonetheless be treated as rational in terms of their accountability or intelligibility.

This kind of view of ‘development’ goes beyond simply the acquisition of SEL competencies, to one of learning how discourse works in all its contrastive and flexible ways as a means for accomplishing action. It is not that children learn the notion of ‘causation’, for example, and can understand what it means as a way of ‘making sense’. Rather it is as Edwards (1997:41) tellingly points out that it is a discursive means for explanation as something that is required precisely because there are other sorts of discourse that can be deployed contrastively against it: intentions, reasons, coincidences, mistakes etc. The availability of different sorts of explanations is what makes explanations such a key resource for children to learn to use.

5. Learning to Present an ‘Inner’ Psychology

A major part of a child’s everyday engagement in conversational practices at school involves showing ‘understanding’, and not just about learning about subjects such as mathematics or music, but rather how these feature in people’s lives. Indeed, because childhood is taken as being an unprecedented period of learning, then children are expected to publicly demonstrate their learning as a sign of development. In this form of talk children need to learn to present themselves as psychological agents in terms of possessing the ability to display their ‘mental processes’ in operating upon an external world such that they can be seen to ‘make sense’. In this way the events are placed prior to this operation, as having happened and needing to be ‘understood’. Talking about the ‘making sense’ of matters is a kind of grammar that allows interlocutors to stabilize versions of events. Indeed, to refer to matters as “nonsense” or “making no sense” is in itself part of this; a discourse that stabilizes matters in the routine of the conversation.

In this communication model there is a realm of events and occurrences and a realm of mental operations requiring to be brought together in order to apprehend or grasp the nature of ‘things’ events and occurrences. In this way the selection and active constitution of these matters as a social practice is occluded through the reification of ‘reality’ and ‘mind’, through the ‘external’ world that requires to ‘understood’ or ‘made sense’ of by an inner mental processing system that ‘perceives’ that outer reality. It is a discourse that children learn, often through parental and teacher checks upon their ‘understanding’. This association between the presentation of objects, events and occurrences and the mental operations that have been applied to them provides for a means of establishing rationality as inhering in the child as an agent and as an index of their development. In this way a perceptual-cognitivist form of conversational practice is actively maintained through an ‘inner/outer’ dualism in which the child is encouraged to look out onto the world in order to ‘make sense’ of it. It is this outer world that is taken as presenting itself as requiring ‘interpretation’ or ‘understanding’ in terms of an active ‘inner’ response. It can also be the basis for creating a version of temporality in which what ‘has happened’ is taken as being apparent in the how children learn to account for ‘decisions’ or

‘choices’. Actions are manufactured in the course of practices that require such accounting. There is a huge cultural imperative upon people to produce in conversation, or at least attempt to produce, normatively appropriate psychological discourse that fits with particular social relations and interactions. For example, children learn that references to ‘thinking’ are taken as indications of deliberation and intent whilst referring to ‘feelings’ can be used to portray actions as arising out of the immediacy of being gripped by emotion or in situations where there is some combination of both.

Children therefore learn that the basis for agency has to be intelligible and therefore such accounts must attend to this in their construction. In this sense the hearer of such an account is positioned as ‘outside’ of the person’s ‘thinking’ as another but external psychological agent who must in the course of the account employ his or her own inner processes in order know the other’s mind. Perhaps this is what makes dialogue such a powerful means of helping children learn to produce accounts of themselves as psychological agents for they must learn that it is predicated upon the construction of talk that is based upon the maintenance of a mentalist discourse and the notion that unless we account for our actions through this discourse that they will be taken as literally non-sense. Socialization here is learning how to display ‘understandings’, ‘interpretations’ or ‘feelings’. This is why SEL has risen up the agenda as an educational concern; in a world where communication is vitally important children need to be able to talk about what they think and how they feel. Such feelings can also be linked to what is learned in class: the joy of music, the emotions invoked in stories and literature, feelings associated with moral issues such as environmental problems, or learning about history in the context challenges to the dominance of particular cultures and groups in society. Learning is not simply a value-free, intellectual exercise devoid of emotional context. It is for this reason that SEL is regarded as of crucial importance in connecting children as people, as agents in society, with what they learn in school and beyond.

6. Conclusion

It is certainly the case that parents and teachers are now being encouraged to invest more time and effort in talking to children in terms of SEL given concerns about the effects of the COVID-19 pandemic through school closures and consequent lack of social contact. However, this concern pre-dates the pandemic and I have sought to provide an alternative account of child ‘development’; one that is based on how children acquire, through their immersion in cultural-discursive practices, the ability to use language as a means for accomplishing various actions as an index of their developing ability to display their sense of identity and agency in the world. It is more than mere acquisition of social skills but rather the ability to use discourse as a public and visible means of engaging in the world. SEL is likely to become much more important in a post-pandemic world but not simply to remediate the current problems and deficiencies brought about by months of school closures but also because that world is now considered to be much more complex and requires of people to communicate much more in a variety of ways. SEL is discourse-based pedagogy that guides the notion of what children’s development should be about. It is a discourse both of, and for, the times.

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Effective Use of a La Carte Learning Model and Enriched Virtual Learning Model

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Abstract

In recent years, many teachers have unconsciously applied the blended learning approach. They always support their education with the online environment in order to support the individual work of the students. For many teachers, blended learning does not save time, but it allows them to make better use of the limited time they spend with their students. A La Carte model, which is one of the Blended Learning models, is the model where students choose one or more courses that support the courses they take face-to-face completely online, and the course and the teacher are completely online. In the Enriched Virtual model, on the other hand, students complete most of the lessons online at home or outside of school, and receive face-to-face training at school as needed. In this model, students mostly work independently using digital learning materials, but get help when needed. When the sub-models of Blended Learning are examined, it appears that each model has its own advantages, and it is necessary to use the most appropriate model according to the learning skills of the students. We have determined that A La Carte Learning Model and Enriched Virtual Model are the most appropriate model for high school students who have difficulty in fixed programs and fixed courses, as it gives them a great opportunity of choosing the best courses according to their interests. We have the conclusion that the sub-models of Blended Learning such as A La Carte Learning Model and Enriched Virtual Model should be applied in the process of Distance Education in order that the learners could be successful and get academic achievement during the recent Pandemic.

Keywords: A la carte Learning, Enriched Virtual Model, Distance Education, Blended Learning, Educational Management

1. INTRODUCTION

The development of science and technology further encourages reform efforts in the utilization of technological results in the learning process (Gane and Beer, 2008). The effectiveness of learning is determined by many factors such as, teaching materials, learning methods and media (Ghilay, 2019; Fitria, Ruslan and Mappedasse, 2021)

Effective learning environments are prepared in order to ensure learning, which is considered one of the most strategic elements of the information society. With the use of Information and Communication Technologies (ICT) in face-to-face learning environments, blended learning has emerged and it has been an opportunity for students to learn outside the classroom in interaction with their teachers and other students (Thorne, 2003; Moursund, 1999). In this way, students gain experiences in lifelong learning and learning to learn in present information society (Vatansever Bayraktar, 2015; Ünsal, 2010; Klein et al., 2009).

One of the most important consequences of the information society is change and transformation (Odabaşı, 2010). The information society has begun to change the habits left over from the industrial society and even the

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habits it produces with the acceleration of change. In a study conducted by the NSBA (2002), the changes in knowledge are summarized as follows (Cited by Şahin and Kesim, 2006; Uysal, 2016).

- Knowledge doubles every two to three years, 7000 scientific articles are published every day.
- High school graduates are exposed to more information than their grandparents faced in a lifetime.
- While only 15% of professions required faculty education, today almost all professions require faculty education.
- In the next 30 years, changes are expected to be equivalent to the changes experienced in the last 300 years.

As a necessity of living in the 21st century, it is necessary to have literacy skills in order to follow such a rapid change in information. It can be said that literacy skills form the basis of 21st century skills. Instead of teaching approaches such as behaviourist, objective and cognitive approaches, learning approaches such as constructivism and connectionism have been brought to the fore. Due to its importance, there has been a strong conceptual diversification for learning such as online learning, mobile learning, virtual learning, flexible learning and blended learning.

Combining different teaching methods to ensure effective learning has been around for many years. For this purpose, teachers mix and use different teaching strategies in classrooms. The technology interpretation of "mixing" is blended learning, which gained significant momentum in 2001. Although blended learning is not a new concept, its potential has emerged with e-learning (Dağ, 2011). Blended learning, which has been presented as an effective instructional design approach in recent years, is the use of different knowledge transfer methods together and in some cases within the scope of a learning method. Blended learning is the combination of two separate learning/teaching models, traditional face-to-face learning system and distributed learning system, with emphasis on computer-based technologies.

2. BLENDED LEARNING

In face-to-face education, technology is used in the classroom, but its use outside the classroom is more limited. In order for the students to understand the lesson better, activities and opportunities should be provided that will enable them to improve themselves at any time after the lesson. In addition, there was a need for applications that enable students to communicate with their teachers and friends about the lessons, to talk simultaneously and to exchange ideas. These opportunities are offered to learners by distance education. For this reason, distance learning, which offers more flexible learning environments and methods in terms of time and place, and the opportunities it provides to learning environments above, has been combined with face-to-face education.

Blended learning is primarily expressed as the mixing of web-based technologies (virtual classrooms, self-teaching education, collaborative learning, video, audio and text streaming) to achieve an instructional goal. Secondly, using a different conceptual approach, combining various educational approaches such as behaviorism, cognition, constructivism to produce the most appropriate learning outcomes with or without using instructional technologies is expressed as blended learning. Thirdly, using face-to-face education under the guidance of a teacher and combining different formats of instructional technologies (video, CD-Rom, web-based learning, distance learning technologies, etc.) is blended learning. Fourth and lastly, blended learning is defined as combining and blending real work tasks and learning technologies to create a harmonious effect for learning (Kayalar, 2021; Kayalar and Kayalar, 2020; Kayalar and Ağaoğlu 2020).

Blended learning does not have a limited scope, such as the use of some strategies such as discussion forums, mail, content presentation, which are used only in e-learning, in face-to-face teaching and mostly as a tool to support face-to-face teaching (Usta, 2007; Ünsal, 2010). Blended learning, which should be accepted as an instructional design approach, is a process that should be strategically planned in order to be implemented in the realization of teaching for a course, in the dimension of a curriculum or an educational institution.

Blended learning focuses on achieving the highest achievement by matching the right learning technologies and applying the learning objectives, with the right personal learning style to equip the right skills to the right person at the right time. The principles hidden in this definition include some important points such as

- The focus is on learning goals rather than sharing method.
- Many personal learning styles need support to reach large audiences.
- Each individual participates in the learning event with different information.
- In many cases, the most effective learning strategy is just what is needed at that moment.

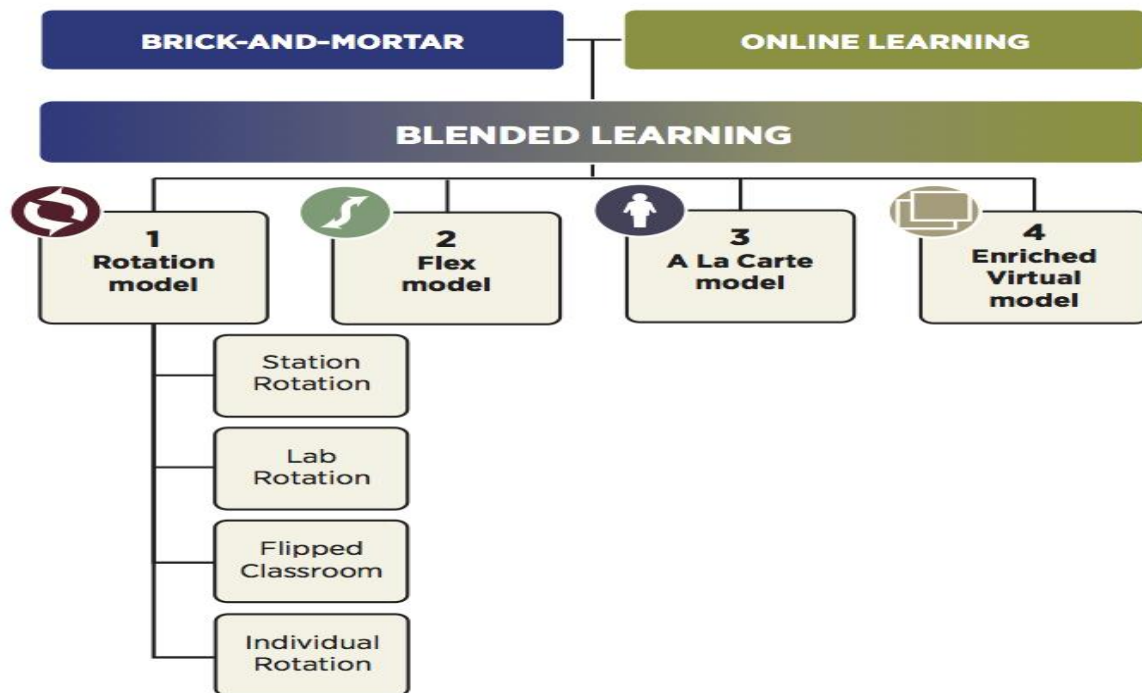
There are main elements associated with blended learning such as psychological, technological, theoretical, communication and management system. Blended learning interacts with computer assisted learning, web based learning, electronic learning, learning management system and learning platform. In addition, there are other areas in which all these elements that blended learning is related to are also related to each other. For example, computer-assisted learning is directly related to behaviorism, computer-assisted applications, lifelong learning, and Web-assisted learning, and developments here change by affecting computer-assisted learning. Web-supported or face-to-face learning approaches can be used in the school environment, inside and outside the classroom. One of them can be done or there may be a few of them. What is important here is the planning to be decided with the participation of other experts in the company of the instructor. In addition, it is the rational evaluation of the school's opportunities and strengths. The blended learning approach to be applied will have many benefits for both the student and the teaching staff, as well as the educational institution and its effectiveness. We can briefly explain some of the benefits of the blended learning approach as: it increases learning effectiveness and makes the richness of learning permanent, it is convenient in terms of time and cost, the results take place at the most appropriate level, and collated studies occur immediately. In addition to these, the application of the blended learning approach includes learning wealth, access to information, social interaction, management of learning and so on. It leads to important results (Osguthorpe and Graham, 2003).

It is understood from these explanations that, in general, this learning approach provides diversity, cooperation and communication density in terms of individual learning, individual speed, listening, reading, seeing and application. In addition, it can be said that feedback has a positive effect such as speed, freedom in the learning environment, saving in time and learning costs. Of the sub-models of blended learning, A La Carte Learning Model and Enriched Virtual Learning Model have outstanding benefits and advantages in education during the recent Pandemic.

3. A LA CARTE LEARNING MODEL

The majority of blended-learning programs resemble one of four models: Rotation, Flex, A La Carte, and Enriched Virtual. The Rotation model includes four sub-models: Station Rotation, Lab Rotation, Flipped Classroom, and Individual Rotation as shown in Table 1 (Horn and Staker, 2014).

Table 1: Chart of Blended Learning



A La Carte Learning Model is a program in which students take one or more courses entirely online with an online teacher of record and at the same time continue to have brick-and-mortar educational experiences. Students may take the online courses either on the brick-and-mortar campus or off-site. This differs from full-time online learning and the Enriched Virtual model because it is not a whole-school experience.

An a la carte model, as the name implies, is a class that a student can choose to take entirely online to accompany other experiences they have at a traditional school or learning center. The teacher of record for the a la carte course is primarily an online teacher. Students may complete the learning activities either at school or at home. This differs from full-time online learning because it is not the only learning experience a student will have as they are still enrolled in traditional teacher-led classes as well.

In a study carried out by Chukwuemeka (2020), it is argued that the A-La-Carte demonstrates and consolidates face to face education with online course. Students take a portion of the courses online to enhance the part taken in the classroom. It should be possible in the classroom or wherever. Through this medium, teachers can grow the scope of study assets that students learn so as to help their inspiration and at last customize students' learning way. The A-La-Carte Model gives students a chance to take an online course notwithstanding the central subjects, giving students greater adaptability over their timetables. For instance, students can take online seminars on organs of speech, unadulterated vowels, diphthongs, consonants and intonation. Likewise, corporate preparing may gigantically profit by the A-La-Carte demonstrate by sparing the worker's time and endeavors. Rather than going to in-class addresses, they can take an online course while driving to work or in the solace of their own home. This model is learning prominence both in the educational and professional workplace since it offers students the chance to control their time, spot and pace while acing their abilities and information.

4. ENRICHED VIRTUAL LEARNING MODEL

Enriched Virtual model—a whole-school experience in which within each course (e.g., math), students divide their time between attending a brick-and-mortar campus and learning remotely using online delivery of content and instruction. Many Enriched Virtual programs began as full-time online schools and then developed blended programs to provide students with brick-and-mortar school experiences. The Enriched Virtual model differs from the Flipped Classroom because in Enriched Virtual programs, students seldom attend the brick-and-mortar campus every weekday. It differs from the A La Carte model because it is a whole-school experience, not a course-by-course model (Hunsinger, 2019).

According to Jenny White (2019) the Enriched Virtual model, by definition, is rather straightforward: the backbone of student learning is online and the student is only required to attend brick-and-mortar school on designated days. Thanks to technology, learning is happening anywhere, anytime, and (sometimes) at varying pace. The required face-to-face time within this model typically serves two main purposes:

- 1) enrich students' learning experiences with group-based work or teacher-led instruction, for example, and
- 2) hold students accountable via regular in-person check-ins with their teachers and advisor(s).

This model isn't flashy; it's quite operational in nature. In the Christensen Institute's research, early adoption of this model emerged among fully virtual schools that shifted to blended learning to provide stronger supports for students who otherwise struggle to stay on track. It's worth noting, however, that this blended model is considered disruptive: it provides learning opportunities not governed by seat time like traditional instructional models, but instead determined by the degree to which students control time, path, pace, and in some cases, place of their learning.

Today, this model is still fairly niche among traditionally brick-and-mortar public schools; few schools tout their "Enriched Virtual" model at conferences or in articles. But when you take a look at schools leveraging this model, their Enriched Virtual practice is pretty exciting in that it has the potential to benefit an increasing number of today's students: without Enriched Virtual's disruptive blended-learning structure, scheduling flexibility, off-campus learning experiences, opportunities to explore emerging passions, and more, wouldn't be feasible for schools to provide.

Many reasons for choosing an enriched virtual model or an à la carte model are the same. Both models allow you to support student-centred learning, develop self-management skills, and personalize learning through a wider range of course options. They can be used to accelerate credit accumulation, resolve timing constraints, or support basic learning skills. Often these models are used with "non-traditional" students. For example, over-age under-credited high school students that have had interrupted academic progress, may need courses that don't fit into their traditional schedule. These models also help in rural areas where some students commute to school too long.

The course needs should be identified at the school in order to get started with the a la carte model or enriched model. Replies for these questions should be found;

- Are there gaps in your course offerings?
- Have students become disengaged in the required courses?
- What are the interests?
- Do you have students who are far below grade level and need an additional course to meet their needs?
- Who will monitor student progress?

Both the a la carte and enriched virtual models are closer to online learning in the spectrum of blended learning and are more often used in higher grade levels. They are classified as blended learning because they still include limited face-to-face time with a teacher. An a la carte model often has mostly traditional face to face classes with an online course supplement whereas the enriched virtual model is mostly online with intermittent face-to-face interactions.

5. RESULT AND SUGGESTIONS

In blended modeling, organizing educational materials in accordance with the online process, bringing methodical and practical learning together and targeting the need-oriented outcome are among the most basic objectives. Individuals' learning skills, levels and past stories differ. In this blending that supports the need-based acquisition of knowledge by using multiple methods, it should be based on determining the educational infrastructure to be created for the needs of students. It is also known that blended learning provides permanent gains, with the principle of sustainability that will allow the effectiveness of the method, and educational achievements that require process management such as research-development, monitoring, analysis-synthesis, also allow measurement and evaluation in multimedia.

The common definition of the enriched virtual model is a course or subject in which students have required face-to-face learning sessions with a teacher and then are free to complete their remaining work remotely. Online learning is the backbone of student learning when the students are not in school. The same person generally serves as both the online and face-to-face teacher and students seldom meet face-to-face with their teachers every weekday. It differs from a fully online class because face-to-face learning sessions are more than optional office hours or social events; they are required.

The face-to-face sessions are often used to introduce the material and expectations or to complete more comprehensive assessments of learning. Often at the end of an enriched virtual model course, the students come together for a final session in which they present what they learned. This is how you might develop speaking and listening skills in a predominantly online learning environment.

Since the teaching-learning process requires a dynamic process management, the role of the teacher is great. In the Blended Learning approach, with the inclusion of technology in education, teacher-student interaction has become even more important. Considering the variability of learning styles, practices based on individual learning. With this approach, which develops the traditional understanding of teaching, the perception that learning does not only take place in the classroom but that technology is an educational need becomes widespread. Through this approach, which is structured on learning rather than teaching, it has been the main goal to train autonomous students and improve their learning capacity. For this purpose, the fact that knowledge is partially removed from being a phenomenon presented by the teacher means that the existence of researcher-student also appears. Supporting and observing the student in the process should be the basic principle of the teacher. It is the responsibility of the teacher to introduce methods that lead to research and aim to develop skills in the transfer of knowledge. The teacher aiming at the lifelong learning skill of the students should be able to support the student's independent determination of the learning according to the needs in the content and subjects of the acquisition. The parallelism of the processes of parsing, verifying, applying and personalizing knowledge with the term independent learner is too important to be left to chance. Freedom and awareness in learning are skills that can be acquired through multiple experiences. Therefore, teacher observation and guidance is essential at the point of producing and reproducing knowledge. One of the unchangeable rules of education is to prepare individuals for the responsibility of shaping society healthily. In this context, the teacher should raise individuals who are equipped with the principle of independent learner education, self-sufficient, productive and aware of their social responsibility.

What makes these models unique is that many schools all over the world have been trying to implement these models more and more to try to help prepare more 21st century learners (Brita Hammer, 2018). As students move onto a postsecondary education, or even into the workforce, more and more postsecondary schools are going in a

virtual setting where they're giving students the opportunity to do online schooling, or you go to an organization that has some online training components. Preparing students to be good 21st century learners—the best way to do that is to give them practice doing that—practice being a 21st century learner. One of the best ways to do that is offer an a la carte or some element of a virtual learning opportunity for students, day in and day out. I'm seeing more and more of this as more and more expectations are being placed on sites around 21st century learning skills, but it's a terrific way to jump into the deep end of blended learning.

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Factors Influencing Employability and Management Countermeasures of Nursing Graduates in Vocational Education in Henan Province, China

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Abstract:

The purpose of this study is to determine the factors that affect the employability of nursing graduates from higher vocational colleges in Henan Province, and to verify the relationship between these influencing factors and the quality of employment. In this study, 1500 questionnaires were randomly distributed, and the collected data were analyzed and researched. The reliability and validity of the questionnaires were verified. Their Cronbach's alpha value is between 0.887-0.977. Data analysis uses methods such as frequency analysis, descriptive statistical analysis, percentage, average, and exploratory factor analysis. The analysis results show that the KMO value of the sampling suitability test is 0.982, indicating that the variables are very suitable for factor analysis. The data passed the Bartlett sphericity test $p < 0.05$, and the approximate chi-square value was 83788.418. An exploratory factor analysis was carried out by using the methodology for the exploratory factor analysis with principal component analysis (PCA) and the orthogonal rotation with varimax rotation method. The results show that there are 5 components with eigenvalues greater than 1, the eigenvalues of all elements range from 1.082 to 26.278, and the cumulative variance is 81.621%.

Keywords: higher vocational education graduates, nursing major, employability, exploratory factor analysis (EFA)

1. INTRODUCTION

With the development of society and economy and the progress of science and technology, China's higher vocational education has developed rapidly. Higher vocational education has gradually taken up an increasing proportion of China's higher education. However, the employment problem of higher vocational education graduates, especially the employability problem gradually became the focus of social attention. Henan Province is the province with the largest educational population in China, with 53,600 schools of all levels and types, and an educated population of 28.1706 million, accounting for 9.49% of the country's total. Henan Province is a large human resources province. At the end of 2019, the total population of the province was 109.52 million, and the gross enrollment rate of higher education was 45.6%. Higher vocational education in Henan Province started in the 1980s. In 1998, with the integration of higher education enrollment and employment in China, higher vocational education in Henan

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Province has entered a period of rapid development. By 2020, there will be 74 higher vocational colleges in Henan Province. Among them, there are 18 public higher vocational education colleges offering nursing majors. Although considerable progress has been made in terms of quantity, due to the relatively weak economic foundation of Henan Province and the late start of higher vocational education, there is still a large gap between it and the regions with developed educational resources. Vigorously developing vocational education and improving the quality of workers play a vital role in promoting the economic rise of the Central Plains. At present, Henan Province is paying more and more attention to the training of nursing talents in higher vocational education with the basic characteristics of "professional and practical". However, to fully meet the needs of practical professional nursing personnel at all levels of the society, the "export" issue of employment also needs to be resolved with the issue of "import", which is solving the problem of talent training.

Although the market's strong demand for nursing professionals has provided a broad employment space for nursing graduates of higher vocational education, the increasingly obvious employability problem has also brought troubles to the employment problems of nursing graduates of higher vocational education. To promote the all-round development of nursing in Henan, in addition to focusing on the training and delivery of clinical nursing professionals in traditional hospitals, it is also necessary to solve the problem of the shortage of nursing talents in grassroots units such as communities, rehabilitation centers, elderly care institutions, and township hospitals. The employment problem of nursing graduates of higher vocational education is characterized by relatively high employment rate but low employment quality. Employment problems will also affect the future development of China's nursing industry. It has received increasing attention from all walks of life. Therefore, research on it has important theoretical value and practical significance.

2. RESEARCH OBJECTIVE

The purpose of this study is to determine the factors that affect the employability of nursing graduates in higher vocational colleges in Henan Province, and to verify the relationship between these influencing factors and the quality of employment.

3. LITERATURE REVIEW

The concept of higher vocational and technical education: In the early 1980s, my country introduced the concept of "higher vocational and technical education" in the field of education. Gu Mingyuan (1991) "Chinese Dictionary of Education" expressed it like this: "Higher vocational and technical education". It belongs to the third level of vocational and technical education in education. It includes vocational and technical education before employment and related re-education after employment. Yang Zhaosheng (2001) believes that higher vocational education nursing education is based on the cultural foundation of high school or the equivalent of high school, and belongs to "post-high school education". It has the basic attributes of higher education and is nursing education of talents based on general education.

The concept of employability: Peng Wei and Wang Xudong (2000) defined employment in "Introduction to Employment" as a form of the combination of labor and means of production, which means that individuals who have reached the legal working age and have the ability to work the process of carrying out legal labor in social work positions and obtaining corresponding remuneration or income from it. Lu Jiao (2003) discussed the concept of employment from both macro and micro perspectives. From a macro perspective, employment refers to the allocation and utilization of labor resources, which are inseparable from economic development and they promote each other. From a micro perspective, employment refers to the labor's own behavior, which depends on the labor's own labor skills, career choice awareness, and employment concepts. It is the prerequisite for the labor's own survival and development, and has an important impact on other social activities of the labor. In the late 1980s, some scholars in the United States revised the concept of employability. They believed that employability is a dynamic process of obtaining initial employment, maintaining employment, re-selecting, and acquiring new positions. While emphasizing the employability of employees, incorporating macro aspects such as the job market and national economic policies, it explains the overall concept of employability more comprehensively. In 2005, the American Education and Employment Commission once again clarified the concept of employability. Employability, or "employability", refers to the ability to obtain and maintain a job. Employability includes not only the ability to find a job in a narrow sense, but also the ability to continue to complete work and achieve good career development.

Regarding employment status and prospects: A study on the employment status and prospects of nursing

graduates in higher vocational education, Hu Wenfei (2009) in his article "Reflections on Employment in Higher Vocational Education and Higher Vocational Nursing Professionals" believes that: current doctors in nation country. The ratio with nursing staff is still at a relatively low level. Nursing professionals are in short supply in the country. The huge market demand is the reason for the high employment rate of nursing professionals. Wang Qingling, Dai Hongying, Wu Xiangqian, etc. (2011) pointed out in the "Survey on the Current Situation and Demand of Nursing Industry Talent Structure": The demand for nursing professions in economically developed areas has begun to level off in 2010, and many large hospitals have only started to respond. Nursing graduates with a bachelor's degree or above are included in the establishment. The demand for nursing professionals is declining, prompting nursing graduates to face severe challenges.

Regarding employment problems: Li Xuejun and Ma Zhanshan (2012) "Employment Survey and Analysis of Nursing Higher Vocational Education" pointed out: Most nursing students still do not understand the status quo of our country, fail to clearly analyze the current layout of nursing staff, ignoring elderly nursing and community nursing. Let alone there is a broad job market in nursing and foreign-related nursing work in foreign countries. In particular, our society has entered an aging society. Most students still choose traditional clinical nursing positions when choosing jobs. Nursing care institutions are being established in various regions, but some students are actively willing to go to these institutions for employment.

Regarding countermeasures: Zhang Ya (2008) "Research on Employment of Higher Vocational Education Graduates" believes that: in view of the current situation of employment difficulties, it is necessary to strengthen the employment guidance and entrepreneurship education of higher vocational education graduates; the state promulgated supporting policies; strengthening social acceptance; improving the methods of running higher vocational education institutions; enhancing the social adaptability of higher vocational education students. Regarding foreign experience in increasing the employment rate of nursing professions, Tao Hongbing, Fang Pengqian, Chen Maosheng, etc. (2006) pointed out: Some developed countries provide different nursing professions according to their own nursing development needs. In addition to traditional nursing work in hospitals, they also vigorously support the development of nursing staff in community and community nursing, rehabilitation centers, educational institutions and other aspects.

4. METHODOLOGY

This study aims to analyze the factors that affect the employment of nursing graduates in higher vocational colleges in Henan Province, and verify the relationship between these influencing factors and the quality of employment. This study uses quantitative research methods.

4.1. Selection of survey area and research object:

The tool of this study is a closed questionnaire. Five public higher vocational colleges in Zhengzhou, Kaifeng, Sanmenxia, Anyang, and Zhoukou, which are representative of Henan Province, were randomly selected, and their nursing care for the five years from 2016 to 2020 professional graduates are used as research objects.

Reliability measurement uses two methods: internal consistency reliability and retest reliability. The internal consistency reliability is evaluated by Cronbach's alpha, which is used to measure the degree of consistency and reliability between the various questions of the questionnaire. According to Nunnally (1978), to confirm that the reliability measures can be reliable, the Cronbach's alpha value have to reach a recommended level of 0.70. According to the sampling results, the Cronbach's α value of all variables is between 0.876 and 0.970, which is higher than 0.70. Therefore, this means that they are reliable.

The design of this questionnaire all adopts single-choice questions, mainly using Likert's five-level scale answer mode. All questions on the scale are positive scores, and the score range is 5-1 as the basis for statistical analysis. The representative range of the score is: 5=very important, 4=more important, 3=fair, 2=not very important, 1=not important.

4.2. Data collection:

Firstly, this study randomly distributed 1,500 questionnaires to the respondents. Before the questionnaire was formally issued, a pilot test was conducted on 50 interviewed students from Zhoukou Vocational and Technical College to test the effectiveness and consistency of the questionnaire. After getting feedback from the pilot test, the question items were adjusted again, and finally questionnaires were issued to 5 nursing graduates from higher vocational colleges in Henan Province, and all the returned questionnaires were complete. Secondly, in order to

complete this research, secondary data such as books, textbooks, papers, independent research and academic papers are obtained from research documents related to the employment quality of domestic and foreign graduates, and from databases such as CNKI. The researcher accurately grasps the latest research trends, finds the breakthrough points of this research, and provides theoretical and practical basis for this research question.

4.3. Data analysis:

After collecting and sorting out the data, the researchers use statistics in the social sciences to check, filter and code the entire data for further research. The first measurement of Cronbach’s alpha value is between 0.887-0.977, which shows that the reliability and quality of this data is good, and the research data is true and reliable. Data analysis uses descriptive statistical analysis, percentage, average, frequency analysis, and factor analysis. The exploratory factor analysis (EFA) method was used to group the initial items in the data analysis, and the variables with high correlation were prepared together. It mainly carries out exploratory factor analysis on the detailed answers of observable variables by extracting principal components. The dimensions with different number of components were fitted and compared, and the rotation factor load is clearly explained.

5. RESULTS

The demographic information of the respondents: according to the results of this questionnaire, the demographic information of the respondents found that most of the respondents in nursing majors are girls (86.47%), and the graduation date is mainly in 2020 (87.54%), The place of employment is mainly county or county-level city (40.05%), and the average monthly income is more than RMB 4000 (34.36%).

In determining the analysis results of the research variables, the Bartlett’s spherical test was used to test the overall significance of the correlation between the variables ($p < 0.05$), and the Kaiser-Meyer-Olkin was used to examine the relationship between 39 factor variables, using the factor analysis to conduct information enrichment research. First, analyze whether the research data is suitable for factor analysis. The research results show that: approximate chi-square = 83788.418, KMO is 0.982, greater than 0.6, which meets the prerequisite requirements of factor analysis, which means that variables can be used for factor analysis research (Hair et al., 2010). In addition, the data was passed the Bartlett sphericity test ($p < 0.05$), indicating that the research data is suitable for factor analysis. In order to confirm the practical significance of the variable classification, the factor load must be greater than 0.60 (Hair et al., 2010). Following this standard, 13 variables were deleted, only 26 variables remain.

Table 1. Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	26.278	67.38	67.38	26.278	67.38	67.38	10.119	25.947	25.947
2	1.919	4.921	72.301	1.919	4.921	72.301	6.737	17.273	43.22
3	1.637	4.199	76.499	1.637	4.199	76.499	6.57	16.847	60.067
4	1.216	3.118	79.617	1.216	3.118	79.617	4.789	12.279	72.345
5	1.082	2.005	81.621	1.082	2.005	81.621	3.618	9.276	81.621
6	0.616	1.579	83.201	-	-	-	-	-	-

...
39	0.047	0.12	100

From table 1 shown that use principal component analysis (PCA) and varimax orthogonal rotation technique to analyze the variables. The results show that there are 5 components with eigenvalues greater than 1, the eigenvalues of all elements range from 1.082 to 26.278, and the cumulative variance is 81.621%. There are Eigenvalues of 26.278, 1.919, 1.637, 1.216, and 1.082. So, the result cannot be rejected, the factor extraction is five elements and it accounts for 25.947%, 43.22%, 60.067%, 72.345%, and 81.621% of the variances. Significantly, all the factors analysis found that the element 1 (F1), social security factor is composed of 13 variables, and the factor load is between 0.658-0.784, and the variance explains 25.947% in the data. The element 2 (F2), own quality factor is composed of 5 variables, and the factor load is between 0.643-0.766, and the variance explains 17.273% in the data. The element 3 (F3), graduate school factor is composed of 2 variables, and the factor load is between 0.669-0.682, and the variance explains 16.847% in the data. The element 4 (F4), basic requirements factor is composed of 4 variables, and the factor load is between 0.689-0.764, and the variance explains 12.279% in the data. The element 5 (F5), special requirements factor is composed of 2 variables, and the factor load is between 0.66-0.716, and the variance explains 9.276% in the data.

6. DISCUSSION AND CONCLUSION

Graduates of higher vocational colleges are important human resources of the society. Guaranteeing their employment quality is not only related to social stability and economic development, but also the basis for the sustained and healthy development of higher vocational education. Scholars such as Deng Lihuan (2014) believe that to effectively improve the employment quality of vocational college graduates requires the joint efforts of individual students, graduate schools, employers, and the government.

Based on the analysis and demonstration of the research results, the author explored the factors affecting the employability of nursing graduates of higher vocational education in Henan Province and the factors of graduate expectations. Through exploratory factor analysis, it is found that there are the following five elements: (i) social security; (ii) own quality; (iii) graduate school; (iv) basic requirements; (v) special requirements. The element information is as follows:

(i) Social security: It refers to the need to work together from the government, medical units, social institutions and other aspects to increase policy implementation, introduce more preferential policies, strengthen the self-construction of primary medical units, eliminate public opinion pressure, and effectively solve the salary income and benefits that graduate are concerned about. The traditional employment concept of graduates is changed through policy guidelines, grassroots post publicity and employment guidance, so as to rationally guide and encourage vocational nursing graduates to find employment at grassroots levels. According to Gu Zhenyan (2010), the unsatisfactory social environment has led to the low employment rate of higher vocational colleges, and the government should relax the investment regulations of foreign-funded enterprises and private enterprises to create more employment opportunities. On the word of Yin Hui (2012), the analysis of the employment rate of higher vocational colleges, the employment philosophy, professional quality and technical ability of enterprise units are the main factors leading to the low employment rate of higher vocational graduates. Besides, Wang Xianwei (2013) explored the reasons that affect the employment of students in higher vocational colleges from both external and internal reasons. The external reasons include the influence of social economy and national policies.

(ii) Own quality: Nursing graduates of higher vocational colleges will be favored by employers only if they have a good level of their own. With the development of the times, most employers are more and more interested in the value of the students themselves, and the educational level requirements are also increasing. The higher the level, the more often graduates are eliminated because they cannot meet the high requirements of employers. It is no exaggeration to say that the decisive factor for the successful employment of graduates is also the comprehensive quality of the students themselves. Regarding the overall personal quality, the empirical survey conducted by Lining Liu (2002) shows that if one's own quality is excellent, employers are happy to accept it even if they do not have a good social relationship. Additionally, Fu Yongchang (2005) believes that with the development of society and economy, employers will have higher and higher requirements for graduates' own quality and academic level, and the focus on talent needs has shifted. Whether it can meet the quality requirements of employers has become the

decisive factor for the successful employment of graduates. Moreover, Huang Jingbao (2008) directly put forward the hypothesis of undergraduate employability through theoretical research and a typical survey of a certain university in Beijing. He believes that the current serious employment problem of undergraduates in my country is mainly due to the lack of employability of undergraduates. Furthermore, Tang Guoying (2016) believes that my country's new economic normal of "slow growth, structural adjustment, and transfer of growth points" has brought challenges and difficulties to vocational college graduates. College students in vocational colleges must improve their ability to adapt to the society. Improve their own vocational skills, so as to achieve the purpose of increasing the employment rate of vocational college students and improving the quality of employment.

(iii) Graduated school: It refers to the high degree of conformity between the training of talents in universities and the needs of the market. It will directly affect the matching degree of talents cultivated by universities and the current talent demand structure of economic and social development, which will restrict the healthy development of the economy and society, and affect college students' quality of employment. In the "Multi-angle Analysis of University Student' Employability and Countermeasures", Du Yi analyzed the college students' job-hunting expectations and the needs of employers, and analyzed the disconnection between the university's talent training plan and social needs, and further analyzed the current employability of college students. There is a gap between it and social needs. He believes that schools need to change the existing education and training model and better integrate with social needs." By Ding Jinchang (2010) put forward the countermeasures and suggestions to improve the employment quality of graduates of higher vocational colleges in terms of talent training model, employment service system, and student entrepreneurship education from the perspective of school teaching reform. In addition, Zhao Hui (2014) believes that the professional setting of higher vocational colleges is the logical starting point for teaching work in higher vocational colleges, and the professional setting has an important impact on the employment quality of graduates in higher vocational colleges, and the professional setting of higher vocational colleges should be employment-oriented by making settings and adjustments.

(iv) Basic requirements which refer to the basic pre-set standards of nursing graduates for their own employment-related indexes, which are mainly reflected in employment salary, benefits, training opportunities and working environment. According to Meng Zhigang (2017), for higher vocational graduates, the demand for employment must be based on the actual situation. Education resources should be integrated to enhance their competitiveness in the market, and they should be forward-looking, which is the positioning of oneself, a calm analysis of one's own abilities, and an objective evaluation standard for oneself. In terms of salary and benefits, vocational graduates must not only see high-paying positions, but also take into account long-term self-improvement demands.

(v) Special expectations. It refers to graduates who not only pay attention to basic salary, benefits, training opportunities and working environment, but also put forward higher requirements for the city where the job is located and whether it is suitable for their hobbies. According to Gao Hongyan (2003), vocational graduates generally hope to work in large cities, large institutions, large companies, universities and other units, and hope that the units they obtain have a good reputation, high efficiency, and comfortable living conditions. However, these employment expectations are significantly different from the actual employment situation. It can be seen that there are many factors that affect the employment quality of graduates in higher vocational colleges, which can be mainly divided into social factors, personal factors and school factors. These are the basic factors that affect the employment of graduates. Only with the joint efforts of the government, employers, individuals, family and school can the employment quality of graduates of higher vocational colleges be effectively improved and the basic demands and special expectations of graduates be met.

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Educational Performance Assessment of OECD Countries Using PISA 2018 Data

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Abstract

With the need of proposing qualified and impartial education to students from all around the world, the efficient use of educational resources and the measurement of students' success in education have gained increasing importance. In this context, the PISA (Programme for International Student Assessment) provides valuable information about the success of 15-year-old students in PISA tests and about the factors that influence the education of students. This paper uses the PISA 2018 database for educational performance assessment of OECD countries. The performance evaluation is conducted by common-weight DEA-based models. The results obtained by different models are compared in terms of efficiency scores, rankings and weight dispersions. In majority of the models, Estonia and Finland are determined as the most efficient countries. While the conventional DEA model identifies ten countries as efficient, the majority of implemented common-weight DEA-based models achieve full discrimination among countries. This assessment can be a good reference for policy-makers to observe the current situation of their countries in terms of education efficiency and to derive political implications for the improvement of their education systems.

Keywords: education, performance assessment, efficiency, common-weight DEA-based approach, PISA 2018

1. Introduction

Governments are looking for international comparisons of education opportunities and systems in order to develop policies that enhance efficiency in schooling and the use of educational resources to meet increasing demands. The PISA (Programme for International Student Assessment) contributes to these efforts by measuring the factors that influence education performances of countries. Together with OECD (Organization for Economic Co-operation and Development) country policy reviews, PISA results can be used to assist governments in building more efficient and equitable education systems. In this way, measuring efficiency in education is a need for fixing the inefficient components of the education systems and moving toward a more efficient and sustainable future for students' education.

In this context, this study aims to evaluate the educational efficiency of OECD countries using PISA 2018 database to compare the current situation of the education systems and to derive political implications for the efficient use of the educational resources. For this purpose, performance evaluation will be conducted by common-weight models based on Data Envelopment Analysis (DEA). DEA is a decision-making tool based on mathematical-programming, which is used for evaluating relative efficiency of homogenous decision making units (DMUs) that consume multiple inputs to produce multiple outputs. Traditional DEA models identify efficient and inefficient units without requiring

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a priori information about the importance of inputs and outputs [1]. Despite their widespread use as a decision tool, these models also have a number of limitations. First, conventional DEA models are solved n times to measure the efficiency scores of all DMUs, where n is the number of homogenous DMUs to be evaluated. Second, the DMUs are not evaluated on a common basis for input and output weights as each DMU is allowed to choose its own weights for maximization of its relative efficiency score. The weight flexibility in DEA may result in a DMU to appear efficient by weighting an input and/or output impractically high while assigning negligible weights to the others [2]. This situation leads to unrealistic weighting schemes and impractical evaluations. Third, while these models dichotomize the DMUs as “efficient” (with an efficiency score of 1) and “inefficient” (with an efficiency score less than 1), they cannot provide a further ranking among the efficient DMUs. Therefore, the discriminating power of these models is not sufficient either for full ranking of DMUs or for identifying the best DMU among the DMUs whose efficiency scores are equal to unity. In order to avoid the shortcomings of conventional DEA models, common-weight DEA-based models can be considered. These models measure the efficiency scores of DMUs by using a common set of weights, provide computational savings and enhance the discriminating power of the analysis.

Despite these advantages, to the best of our knowledge, the common-weight DEA-based models have not been used in evaluating educational efficiency using PISA data. Therefore, this paper aims to provide a comparative analysis using a number of selected common-weight DEA-based approaches for educational performance assessment utilizing the most up-to-date edition of the PISA database.

The PISA conducted by OECD, evaluates the knowledge and skills acquired by 15-year-old students. The triennial assessment, launched in 1997, not only assesses the students’ level of knowledge but it also examines how well students can integrate the acquired knowledge and skills in daily life routines and can apply what they have learned in unfamiliar situations, both in and outside of school [3]. The assessment has three core subjects as reading, mathematics and science literacy. In addition, it includes optional assessments such as financial literacy and global competence according to the preference of participating countries [4]. Policy-makers around the world understand the relative strengths and weaknesses of the education systems of their countries through PISA findings. Additionally, they find the opportunity to compare the PISA results with other countries and form benchmarks for improvements in the educational outcomes of their countries. For this comparison, PISA database is valuable and very rich as the PISA 2018 results represent 31 million 15-year-old students from the participation of 710 000 students in the schools of the 79 participating countries and economies including 37 OECD countries [5]. Therefore, the PISA database is used in this paper for evaluating education efficiency of OECD countries.

The rest of the paper is organized as follows. Section 2 provides a review of the literature about DEA models applied to PISA data, while section 3 presents the methodological approach. In Section 4, comparative evaluation of OECD countries using PISA 2018 data is illustrated via common-weight DEA-based models. Discussion and concluding remarks are outlined in the last section.

2. Literature Review

Since 1990s, there is an effort to measure the efficiency in education at different levels such as class, course, school or country. According to Witte & López-Torres [6], DEA is the most frequently used methodology throughout these studies and the PISA dataset is a valuable source for input and output data. A well-known conventional DEA model is the CCR model proposed by Charnes *et al.* [7]. Although the CCR model identifies efficient DMUs, it cannot rank the efficient units as all the efficient units possess an efficiency score of 1. Moreover, the model is solved separately for each DMU and allows the evaluated DMU to select the weights in a way to maximize its efficiency. Therefore, it cannot provide a common weight basis for an overall assessment and, in general, it cannot identify the best DMU.

The CCR model is used in the context of education efficiency and PISA data with the output-orientation [8-9] or the input-orientation. Marti Selva & Medina [10] applied the CCR model for education efficiency comparison of European and Asian countries. The data source of inputs and outputs were the results from TIMSS 2015 (Trends in International Mathematics and Science Study). The applied methodology separated the efficient countries from the non-efficient ones, however further discrimination among the efficient units could not be achieved. Margaritis *et al.* [11] investigated relative efficiency of upper secondary schools in the region of Central Greece by using the input-oriented CCR model and the BCC model. Malmquist Indexes for years 2015-2018 were also calculated. Data source

for the input and output indicators was the records of upper secondary schools and regional directorate of Central Greece.

When DEA applications in education where the PISA dataset is used as the source of inputs and outputs are analyzed, the most frequently used DEA model is the BCC model proposed by Banker *et al.* [12]. This model is one of the conventional DEA models and differs from the CCR model [7] with its assumption of variable-returns to scale (VRS). The BCC model is solved n times, where n is the number of DMUs, and each time it generates weights for the inputs and outputs in favor of the evaluated DMU. This situation leads to computational disadvantages and unrealistic weighting schemes. Moreover, the BCC model identifies the DMUs with an efficiency score of 1 as BCC-efficient but cannot allow further discrimination among these efficient units.

The PISA studies using the BCC model can be classified in three groups. The first group used the classical BCC model [13-14]. The second group applied the BCC model with an output-orientation [15-20]. The last group applied the BCC model with an input-orientation [21-22]. Although these models suffer from the shortcomings of the BCC model such as insufficient discriminating power, computational disadvantage and weight flexibility, the use of output-oriented or input-oriented DEA models have several advantages. The output-oriented BCC model can answer the question of how much the outputs can be improved for better performance and the input-oriented BCC model answers the question of how much the inputs can be reduced to have enhanced performance.

Among the studies using output-oriented BCC models, one group is distinguished based on their two-stage approach [15-19]. In this group of studies, they firstly applied the DEA model to measure the efficiency scores, secondly they applied a regression model to explain the efficiency scores, in other words to identify and visualize variables that are associated with PISA test performances. To illustrate, Coco & Lagravinese [17] used the output-oriented DEA model under VRS to evaluate efficiency scores of OECD countries for the first stage of the study. Cumulative spending in education (in USD) was used as the input; mathematics, reading and science scores were used as the outputs from the PISA 2009 database. Then, the efficiency scores were corrected with a bootstrap procedure introduced by Simar & Wilson [23] and explained in a truncated regression with independent variables such as parents' educational attainment, immigrant status, labor-market indicators, cronyism, the number of students per class, teaching time, examination and inspections.

3. Methodology

Data Envelopment Analysis (DEA) is a linear programming technique developed by Charnes *et al.* [7] for measuring efficiency scores of homogenous decision-making units (DMUs) using multiple inputs and multiple outputs. DEA considers n decision-making units (DMUs) to be evaluated, where each DMU uses varying amounts of m different inputs to produce s different outputs. The relative efficiency (E_{j0}) of a DMU equals to the ratio of its total weighted output to its total weighted input. This ratio is the objective of the mathematical program that is solved for the evaluated DMU. The model is formulated with normalizing constraints that ensure the sum of weighted output to the sum of weighted input ratio of every DMU be less than or equal to unity.

$$\max E_{j0} = \frac{\sum_{r=1}^s u_r y_{r0}}{\sum_{i=1}^m v_i x_{i0}} \tag{3.1}$$

subject to

$$\begin{aligned} \frac{\sum_{r=1}^s u_r y_{rj}}{\sum_{i=1}^m v_i x_{ij}} &\leq 1; \quad j = 1, \dots, n, \\ u_r, v_i &\geq 0; \quad r = 1, \dots, s; \quad i = 1, \dots, m. \end{aligned}$$

Here, y_{rj} is the amount of output r produced by DMU j and x_{ij} is the amount of input i used by DMU j , and u_r, v_i are the weights for output r and input i , respectively, which are determined in favour of the evaluated DMU. The subscript '0' is used for referencing the evaluated DMU. E_{j0} is calculated using the most favourable weights of outputs and inputs (u_r and v_i) for maximizing the relative efficiency of the evaluated DMU.

The above model is an ordinary fractional programming problem, and it can be rewritten as a linear program by using the transformation of linear fractional programming [33][34]. The linear form of model (3.1):

$$\max E_{j_0} = \sum_{r=1}^s u_r y_{rj_0} \tag{3.2}$$

subject to

$$\begin{aligned} \sum_{i=1}^m v_i x_{ij_0} &= 1, \\ \sum_{r=1}^s u_r y_{rj} - \sum_{i=1}^m v_i x_{ij} &\leq 0, \forall j, \\ u_r, v_i &\geq \varepsilon, \quad \forall r, i. \end{aligned}$$

where ε is a very small non-Archimedean positive number added to the model for preventing zero-weights.

As mentioned above, the conventional DEA model (CCR model) has several limitations such as impractical weight flexibility and poor discriminating power. In order to deal with the limitations, researchers have focused on common-weight DEA-based models. Some of these researches have focused on finding the best decision-making unit (DMU) while others have focused on providing a full ranking between the DMUs.

Karsak & Ahiska [2] developed a minimax efficiency model for determining the best DMU taking into consideration multiple inputs and outputs. The enhanced discriminating power of the approach was shown with examples mentioned in earlier researches and the model achieved a better weight dispersion for inputs and outputs. Foroughi [24] proposed a mixed integer linear programming (MILP) model for finding the most efficient unit and extended the model for ranking all extreme efficient units. The model was tested with real-life examples such as facility layout design selections. Wang & Jiang [25] proposed three alternative MILP models for identifying the most efficient DMU under different returns to scale. The proposed MILP models were illustrated with four numerical examples. Sun *et al.* [26] developed two different common-weight DEA-based models considering ideal and anti-ideal DMU for performance evaluation and full ranking. The models were applied for the performance assessment of Asian lead frame firms and flexible manufacturing systems. Lam [27] introduced a new MILP model whose objective was similar to the super-efficiency model. The proposed model was compared with two recent models with two illustrative examples about facility layout design and hospital management. Toloo [28] developed a new minimax MILP model for finding the most efficient DMU. The approach was illustrated with three different case studies from the literature and the results were compared with other methods. Carrillo & Jorge [29] constructed a multi-objective DEA approach for ranking alternatives. They used the concept of distance to an ideal, and thus the model chose the common set of weights by minimizing the total Tchebychev distance or Manhattan distance of DMUs to an ideal point. Toloo & Salahi [30] presented a new nonlinear mixed integer-programming (MIP) model whose discriminating power was high enough for fully ranking all DMUs. The model was linearized and two examples were used from the literature for the comparison with other models. Karsak & Goker [31] proposed a novel common weight multiple criteria decision making (MCDM) approach based on the model proposed by Karsak & Ahiska [2] for the selection of best performing DMU. The approach was compared with other methods and applied to two case studies. The results showed that the model provided an enhanced discriminating power for the rank-order and improved weight dispersion for inputs and outputs. Lately, Özsoy *et al.* [32] proposed a new MIP model without epsilon based on the approach proposed by Toloo & Salahi [30]. Discriminating power of the model was illustrated with a simulation study where it was shown that the model was able to provide full ranking.

4. Educational Performance Assessment

4.1. Presentation of Data

This paper provides educational performance evaluation of OECD countries by considering some indicators from PISA 2018 database. The indicators are categorized as inputs and outputs in line with DEA context. DEA considers inputs as indicators to be minimized and outputs as factors to be maximized.

For this study, the inputs and outputs are identified by taking into consideration the most frequently used indicators of PISA database in DEA applications [35]. The education systems of countries are modeled as production processes that produce the success of students in PISA test by consuming different amounts of educational resources.

The PISA test scores in reading, mathematics and science are the outputs, and teachers/students ratio, learning time (in minutes per week) and the average number of computers available in schools for educational purposes are selected as the inputs of the study, respectively. Raw data for the inputs and outputs are provided in Table 1.

Normalization for data is conducted via a linear normalization scheme. Normalization for input data is performed by using x_{ij}/x_i^* , where $x_i^* = \max_j(x_{ij})$ for $\forall i$, and output data is normalized as y_{rj}/y_r^* , where $y_r^* = \max_j(y_{rj})$ for $\forall r$ [2]. All the inputs and outputs are extracted from PISA 2018 database [36]. Concerning the lack of data for some OECD countries, 29 countries are included in the analysis.

Table 1. Input and output data for OECD countries

OECD members	Input1	Input2	Input3	Output1	Output2	Output3
Australia	0.074627	1550	196	502.6317	491.36	502.9646
Austria	0.09177	1730	140	484.3926	498.9423	489.7804
Belgium	0.107527	1669	109	492.8644	508.0703	498.7731
Czech Republic	0.076555	1536	63	490.2188	499.4677	496.7913
Denmark	0.073529	1655	53	501.1299	509.3984	492.637
Estonia	0.080898	1563	56	523.017	523.4146	530.108
Finland	0.092001	1479.32	57	520.0787	507.3014	521.8846
France	0.086207	1646	183	492.6065	495.4076	492.9771
Greece	0.10492	1662	18	457.4144	451.3703	451.6327
Hungary	0.093966	1586	65	475.9867	481.0826	480.9117
Iceland	0.09423	1637	68	473.9743	495.1874	475.0241
Ireland	0.078171	1730	77	518.0785	499.6329	496.1136
Israel	0.085977	1753	62	470.4152	463.0345	462.1966
Italy	0.107224	1742	90	476.2847	486.5899	468.0117
Japan	0.083785	1682.94	108	503.856	526.9733	529.1354
Korea	0.074331	1776.4	92	514.0523	525.933	519.0073
Latvia	0.09116	1556	42	478.6987	496.1263	487.2506
Lithuania	0.095214	1510	64	475.8735	481.1912	482.067
Luxembourg	0.106603	1646	213	469.9854	483.4215	476.7694
Netherlands	0.057406	1632	199	484.7837	519.231	503.3838
Poland	0.123712	1697	33	511.8557	515.6479	511.0356
Portugal	0.096169	1759	69	491.8008	492.4874	491.6773
Slovak Republic	0.077637	1517	56	457.984	486.1649	464.0476
Slovenia	0.113344	1686	71	495.3456	508.8975	507.0065
Sweden	0.083958	1631	106	505.7852	502.3877	499.4447
Switzerland	0.077259	1565	83	483.9294	515.3147	495.2763
Turkey	0.074335	1571.39	38	465.6317	453.5078	468.2996
United Kingdom	0.065359	1613	260	503.9281	501.7699	504.6675
United States	0.05814	1822	475	505.3528	478.2447	502.38

4.2. Findings

This section shows the implementation of various common-weight DEA-based approaches using PISA data and provides a comparative evaluation for different outcomes obtained by the implemented models. GAMS software with CPLEX solver is used for performing the computations. The CCR model yields ten efficient countries that are

country₅, country₆, country₇, country₉, country₁₇, country₂₀, country₂₁, country₂₇, country₂₈, country₂₉, while other countries are inefficient. In order to allow further discrimination among countries, common-weight DEA-based models proposed by Karsak & Ahiska [2], Wang & Jiang [25], Sun *et al.* [26], Toloo [28], Carrillo & Jorge [29], Toloo & Salahi [30], Karsak & Goker [31], and Özsoy *et al.* [32] are applied to PISA data. In this study, the epsilon value is taken to be 10^{-6} for all the models other than the model proposed by Toloo & Salahi [30], where the epsilon value is calculated to be $1.2009E+05$ with a mathematical-programming model. Moreover, M is taken to be 10^6 for the computations.

The efficiency scores and overall rankings obtained by different common-weight DEA-based models are given in Table 2. All models other than the model by Wang & Jiang [25] achieved full ranking of DMUs. Estonia (country₆) is identified as the most efficient country according to models proposed by Karsak & Ahiska [2], Wang & Jiang [25], Toloo [28], Carrillo & Jorge [29]. On the other hand, Finlandia (country₇) is identified as the best performing country by Sun *et al.* [26], and Karsak & Goker [31] while Estonia has taken the second place in these models' results. Alternatively, Netherlands (country₂₀) is determined as the most efficient country using models by Toloo & Salahi [30] and Özsoy *et al.* [32].

Estonia and Finland are identified as minimax efficient countries according to models Karsak & Ahiska [2] and Karsak & Goker [31]. At the second step of Karsak & Ahiska [2] model, Estonia is the most efficient country for discriminating parameter k equals to 0.47. However, Finland is the most efficient unit with regard to the second step of model proposed by Karsak & Goker [31]. Wang & Jiang [25] model assigns efficiency score of 1 to Czech Republic and Finland. Alternatively, model proposed by Toloo [28] also calculates efficiency score of 1 for Czech Republic.

In Table 3, the weight dispersion for inputs and outputs obtained by various common-weight DEA-based models is given. In the first model proposed by Sun *et al.* [26], v_1 , u_1 and u_3 equal to epsilon (ϵ) and v_3 is very close to epsilon with a value of $2.3991E-5$, thus this model results in poor weight dispersion by taking into account just one input and one output for efficiency evaluation. In a similar way, the second model proposed by Sun *et al.* [26] assigns the value of epsilon to v_1 , v_3 , u_2 and u_3 . Hence, that model considers just one input and one output. Models proposed by Wang & Jiang [25] and Toloo [28] achieve very similar weights as they used the weight constraints from [37] for avoiding zero-weights. Model proposed by Carrillo & Jorge [29] using Tchebychev distance yields poor weight dispersion because beside the value of v_2 , all the weights equal to epsilon. In model proposed by Toloo & Salahi [30], u_1 and u_3 equal to epsilon (ϵ), therefore this model considers just one output ($u_2 > \epsilon$). The mentioned unrealistic weighting schemes that consider one input and one output impair the robustness of the related models.

Models in Karsak & Ahiska [2] and Karsak & Goker [31] yield enhanced weight dispersion by considering all the inputs and two outputs for efficiency calculations. On the other hand, model in Özsoy *et al.* [32] takes into account all the inputs and outputs with non-zero weights but the magnitude of weights vary considerably. For example, u_1 and u_3 equal to 0.167 while u_2 equals to $2.39E+06$. The importance of the second output is relatively very high in efficiency calculations.

Table 2. Rankings with respect to efficiency scores of countries

		CCR model	Karsak & Ahiska [2]	Wang & Jiang [25]	Sun <i>et al.</i> [26] model 1	Sun <i>et al.</i> [26] model 2	Toloo [28]	Carrillo & Jorge [29]	Toloo & Salahi [30]	Karsak & Goker [31]	Özsoy <i>et al.</i> [32]
Country1	Australia	12	11	14	9	3	14	15	9	6	9
Country2	Austria	25	21	24	24	24	22	24	21	23	21
Country3	Belgium	23	20	25	14	19	25	22	24	20	24
Country4	Czech Republic	14	4	2	4	4	2	3	6	3	6
Country5	Denmark	1	6	4	13	10	4	5	3	8	3
Country6	Estonia	1	1	1	2	2	1	1	2	2	5
Country7	Finland	1	5	2	1	1	3	2	12	1	12
Country8	France	20	19	19	19	16	19	21	17	18	17
Country9	Greece	1	29	26	27	27	26	26	29	29	29
Country10	Hungary	22	18	17	16	13	17	16	20	17	20
Country11	Iceland	21	17	18	17	21	18	18	18	19	18
Country12	Ireland	15	15	11	22	14	11	14	11	15	11
Country13	Israel	28	25	21	28	29	21	25	22	28	22
Country14	Italy	29	26	27	26	28	27	27	26	27	26
Country15	Japan	17	8	10	10	15	10	9	10	11	10
Country16	Korea	13	10	8	20	22	8	12	7	14	7
Country17	Latvia	1	12	12	6	9	12	7	16	10	16
Country18	Lithuania	18	14	15	7	5	16	10	19	13	19
Country19	Luxembourg	26	27	29	21	23	29	28	28	25	27
Country20	Netherlands	1	2	6	8	17	6	11	1	5	1
Country21	Poland	1	24	23	15	12	24	19	27	21	28
Country22	Portugal	27	23	20	25	25	20	23	23	24	23
Country23	Slovak Republic	16	7	7	5	11	7	6	8	7	8
Country24	Slovenia	24	22	22	18	20	23	20	25	22	25
Country25	Sweden	19	13	13	12	7	13	13	14	12	13
Country26	Switzerland	11	3	5	3	8	5	4	5	4	2
Country27	Turkey	1	16	9	23	18	9	8	13	16	14
Country28	United Kingdom	1	9	16	11	6	15	17	4	9	4
Country29	United States	1	28	28	29	26	28	29	15	26	15

Table 3. Weight dispersion for inputs and outputs

Weights	Karsak & Ahiska [2]	Wang & Jiang [25]	Sun <i>et al.</i> [26] (model 1)	Sun <i>et al.</i> [26] (model 2)	Toloo [28]	Carrillo & Jorge [29] Tchebychev	Toloo & Salahi [30]	Karsak & Goker [31]	Özsoy <i>et al.</i> [32]
v ₁	0.18	0.261	0.000001	0.000001	0.271	0.000001	2.2155E+06	0.103	2.19E+06
v ₂	0.339	0.34	1.232	1	0.332	2.60E-06	1.2027E+06	0.427	1.20E+06
v ₃	0.063	0.167	2.3991E-05	0.000001	0.167	0.000001	3.3492E+05	0.03	3.17E+05
u ₁	0.008	0.167	0.000001	1.143	0.167	0.000001	1.2009E+05	0.133	0.167
u ₂	0.41	0.167	1	0.000001	0.167	0.000001	2.1723E+06	0.307	2.39E+06
u ₃	0	0.167	0.000001	0.000001	0.167	0.000001	1.2009E+05	0.000001	0.167

5. Discussion and Concluding Remarks

Governments are looking forward to enhance their educational policies for managing educational resources efficiently and for establishing successful education systems. In order to measure these efforts, the PISA proposed by OECD provides a valuable source of data. PISA measures the success of 15-year-old students in main subjects of reading, mathematics and science every three years and provides various indicators that influence the students' success. Thus, the latest edition of PISA 2018 database assesses the current situation of education systems of OECD countries and enables to derive policies for improving the existing systems. In this context, PISA database can be a valuable source for measuring how efficient are the education systems of OECD countries.

This paper compares educational performance of OECD countries by using different indicators from PISA 2018 database. The performance assessment is conducted by various common-weight DEA-based approaches. As conventional DEA models have several limitations such as poor weight dispersion and insufficient discriminatory characteristics, the use of common-weight DEA-based models is practical in terms of efficiency evaluation and ranking.

The models proposed by Karsak & Ahiska [2], Wang & Jiang [25], Sun *et al.* [26], Toloo [28], Carrillo & Jorge [29], Toloo & Salahi [30], Karsak & Goker [31] and Özsoy *et al.* [32] that are selected from literature on common-weight DEA-based methods by considering comparative advantages and limitations are implemented. The outputs are selected as reading, mathematics and science scores in PISA tests while the inputs are number of teachers per number of students, total learning time in minutes per week and average number of computers available in schools for education purposes.

The results obtained by different models are compared in terms of efficiency scores, rankings and weight dispersions for inputs and outputs. In majority of the models, Estonia and Finland are selected as the most efficient countries. The similarities between the sets of rankings obtained by different models are tested with Spearman rank correlation. The strongest similarity is observed between the rank-orders obtained by Wang and Jiang [25] and Toloo [28]; and Toloo & Salahi [30] and Özsoy *et al.* [32]. The problem of obtaining a full rank-order is observed for the CCR model as it identifies ten countries as efficient. Moreover, the model of Wang & Jiang [25] cannot fully rank the DMUs by yielding the same efficiency score of 1 for two countries. The weight dispersions are enhanced in models proposed by Karsak & Ahiska [2] and Karsak & Goker [31] as these models consider all the outputs and two inputs for efficiency calculations. Models proposed by Sun *et al.* [26], Carrillo & Jorge [29] and Toloo & Salahi [30] yield relatively poor weight dispersion by assigning a negligible value to more than one input and/or output.

To the best of our knowledge, this paper is the first to implement common-weight DEA-based models in the context of educational performance assessment using PISA data. Until now, efficiency assessments in education are generally conducted with conventional DEA models, thus a full rank-order could not be achieved among DMUs. Therefore, this study provides a more comprehensive and practical educational assessment of OECD countries by providing a rank-order for all the countries in most of the applied models. This assessment can be a good reference for policy-makers to observe the status of their countries in terms of education efficiency. Moreover, as the PISA 2018 is the latest edition of the PISA cycle, the performance assessment provides the latest analysis.

Although the PISA database is very rich in terms of educational indicators and indexes, it contains only exact data. However, PISA also publishes the answers of students to different questions used in PISA tests and in extra questionnaires. Therefore, the future research may focus on proposing a methodology to deal with these answers in a way to incorporate imprecision into the decision framework. This will enable to include qualitative data provided as linguistic variables into the education performance assessment.

Acknowledgements

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**Management, Economics and Marketing
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How the Media Affect Their Readers in the Times of State of Emergency

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Abstract

The issue of manipulative techniques and their use in the media is currently a global topic. In this article, I will focus on specific events that have been reported on the first pages of the most read Czech newspapers. The aim of this thesis is the analysis of manipulative techniques in the papers BLESK, MF DNES and PRÁVO. The thesis will take the form of a one-case study, in which it will discuss the approach of three different Czech daily papers to current topics with nationwide overlap. I solve the study as part of doctoral study and scientific grant E 41-66 – Metropolitan University Prague.

Keywords: Agenda setting, media representation, newspaper, performance, priming.

1. INTRODUCTION

This academic project elaborates on the topic of media representation, in other words, how the media represent security risks in communication. The thesis is focused on a sample of Czech printed periodicals and visual media. The goal of this thesis is to describe, map and analyse tendency mechanisms that the media can use to affect their readers, listeners and audience. One of the main reasons for the choice of this topic is its up-to-dateness. With its meaning, it will also bring contribution from the standpoint of international overlap, because the media all around the world represent security risks in communication.

In the context of the hereby presented project, medial image is understood as a way of representing a certain problematic or a subject in the media. The prerequisite is that the language devices, visual arrangement, voice tone of the anchor and naming are the result of an up-to-date social norm that is redefined in everyday communication. The form, arrangement and incorporation into the overall context of the analysed media will therefore be one of the main means for the definition of the way of medial representation of security risks in communication.

2. Agenda setting theory

Several theories are applied within the process of creating the medial image, with the *agenda setting theory* being the best-known. Walter Lippmann was the first to come with the idea of agenda setting in 1922 in his book *Public Opinion*, although he did not use the actual term himself yet. Lippmann developed the idea that the news media inform about the events that take place outside the immediate experience and form a cognitive world map. According to Lippmann, public opinion does not react to the outside environment but to the pseudo-environment created by the news media.²

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² ČERVENKA, Jan. Agenda-setting: teoretické přístupy. Praha: Sociologický ústav Akademie věd ČR, 2008, s. 12. ISBN 978-80-7330-151-4.

This idea was later further developed by Maxwell McCombs and Don Shaw who were the first to use the term *agenda setting*. They carried out a small research during the presidential campaign in 1968. Its result was the confirmation of the agenda setting theory which says that the topics emphasised in the news are viewed as important by the public after certain time, in other words, it is the medial agenda that establishes the public agenda.³

The topic which is to be incorporated into the media agenda must carry certain qualities known under the summarising term *News values* concept. „Under *News values* we understand all of the factors that decide about the incorporation of a piece of news into the news programme in a certain period and certain social and cultural environment.“⁴

Whether a piece of news shall be incorporated into the media agenda can be decided based both upon the intensity of a single factor and a combination of multiple factors. The first author to use the term *News value* is Walter Lippmann again in his book *Public Opinion*. Lippmann says that the news values are: unambiguity of an event, unexpectedness, geographical proximity, personal interest and conflict. The first methodologically supported analysis was carried out as late as in 1965 by Johan Galtung and Mari Ruge. Their empirical research brought twelve news values: frequency, threshold, unambiguity, meaningfulness, consonance, unexpectedness, continuity, compositional balance, elite nations/regions, elite people, personification and negativity.⁵

Especially in the recent years has this list become an object of criticism and has been adjusted. Harcup and O'Neill modified the list in accord with the current state of journalism. According to them, news has to fulfill one or more of the following criteria: the power elite, celebrity, entertainment, surprise, bad news, good news, magnitude, relevance, follow-up, newspaper agenda.⁶

The choice of individual pieces of news is affected not only by their qualities but also by the type of media. Different criteria of choice apply in printed news compared to television news. Television prefers events with available picture material. This factor is crucial especially in foreign events where television is limited by the availability of pictures offered by agencies. Often, it also tries to incorporate such news where it can use the presence of a reporter on the place of the event into its medial agenda. Therefore it may sometimes happen that rather than the importance of the news, the main effort is to make good news of the presence of the reporter in the area. The last major difference between television news and printed news is the lesser amount of events contained in one programme, along with the lesser number of mediated facts about each one of them.⁷

Another important theory involved in the genesis of the medial image is the theory of priming, which focuses on the importance of the topic and its place within the media agenda. In case the event fulfills certain qualities it may become the main event in the agenda of all mass media.⁸

The issues of medial image are also addressed by Jaromír Volek who develops Kershaw's theory of performative society. Although its origins reach as far as the post World War I period, it started gaining importance in the beginning of the 1970s, in the era when the need of individuals to follow others and to represent one's self at the same time became a part of everyday life. This phenomenon is known under the term *performance* which „has the nature of public activity where people act both as members of the audience and performers at the same time.“⁹

3. Introduction of the doctoral project

The subject of research are Czech printed daily newspapers, based on two criteria:

³ MCCOMBS, Maxwell. *Agenda setting: nastolování agendy: masová média a veřejné mínění*. Praha: Portál, 2009, s. 27-32. ISBN 978-80-7367-591-2.

⁴ JIRÁK, Jan a Barbora KÖPPLOVÁ. *Média a společnost*. Vyd. 2. Praha: Portál, 2007, s. 77. ISBN 978-80-7367-287-4.

⁵ Ibid. p. 77-78.

⁶ HARCUP, Tony a Deidre O'NEILL. *What Is News? Galtung and Ruge revisited*. *Journalism studies*. 2001, Volume 2, Issue 2, 261-280.

⁷ TRAMPOTA, Tomáš. *Zpravodajství*. Praha: Portál, 2006, s. 27-28. ISBN 80-7367-096-8

⁸ JEŘÁBEK, Hynek, Jan ROSSLER, Pavel SKLENAŘÍK. 2013. „Mediální obraz Karla Schwarzenberga v tištěných denících před prezidentskými volbami 2013.“ *Naše společnost* 11 (2): 3-15, <http://dx.doi.org/10.13060/1214-438X.2013.11.2.1>.

⁹ VOLEK, Jaromír. *Mediální obraz ve volební kampani* In: 22. konference Člověk a média: Mediální obraz politiky(a) [online]. Praha: 18. 4. 2013 [cit. 2020-05-11]. Dostupné z: http://www.clovekamedia.cz/konference/sborniky/cm_2013_jaro.pdf

- 1) circulation (number of copies)
- 2) area-wide availability including the Saturday issue

This thesis focuses exclusively on the analysis of texts and coverages that shall clarify the problematics of security risks in communication. Both text and visual communication (news and journalistic articles, commentaries, coverages, etc.) published in 2020 will be analysed, since this is the year of events with expected high medial attraction in Czech media. The researched event will be the spreading of the Coronavirus both in the Czech Republic and in the World, according to the leading Czech daily papers.

The goal of this academic research is to analyse the medial image of security risks in communication. This topic is very much up-to-date and also has international overlap and the possibility to be published in the Erih, Scopus or WoS databases. The final dissertation thesis will focus on the media representation, in other words, how the media represent security risks in communication. The dissertation thesis will analyse what kind of arguments are used in communication. The goal of the thesis is to find out what effect does the medial image of the current event itself have on the overall understanding of the event.

The main research questions of this thesis:

1. Do manipulative techniques appear in referring about the events with nation-wide reach in the main Czech daily papers?
2. If the main research question is confirmed, which manipulative techniques did the BLESK, MF DNES and PRÁVO daily papers use most frequently during a monitored period?

The whole prepared project is based on a pre-research of 78 articles in the renown Czech daily papers. The pre-research monitored the journalistic reports of the renown Czech papers on the topic of the Cronavirus on April 18th, 2020.

4. Pre-research

Analysis of manipulative techniques in selected Czech daily papers.

Monitored topic: spreading of the Coronavirus infection in the Czech republic and abroad.

Observed daily papers: BLESK, MF DNES, PRÁVO

Sample: 78 articles (with length of text from three paragraphs up to full-page interviews)

Observatio period: April 18th, 2020

Following observed content units were set for the code book:

The article invokes resentment, fear, hate, the article soothes the reader, the article includes blaming/fabrication/labeling, relativisation, overall negative framing of the article, unsupported claims, selective choice of information, manipulation using picture/photograph, opinion of the author in the news, emotional tone (hate), compassion. Negative verbs.

Nuber of quoted people and their expertise in the topic.

Furthermore, following these elements of argumentation is exercised:

- ad populum (to the crowd – everyone/all);
- argumentum ex concessis: we are finding out whether what the opponent claims is not in conflict with what he or she used to claim earlier or with how he or she acts or what the society accepts;
- false dilemma: we reduce the number of considered possibilities only up to two, we don't take the other ones into consideration. The offered possibilities contrast each other, but they are not logically opposite;
- slippery slope: chain of subsequent arguments, whereas each of them is valid only with a certain probability. Each partial argument will turn the direction we want to follow;
- suppressed evidence: presenting only that part of evidence that proves the claim and withholding the parts that contradict the claim.

Choice of the daily papers: From among the Czech daily papers were chosen those which are often mentioned as examples of the most read Czech printed periodicals. Saturday issue was chosen deliberately, because this day, all chosen daily papers include rich supplements and the most various commentaries and summaries of the up-to-date information from the currently ending week.

Data from the MEDIA PROJEKT research for the 1st and 2nd quarter of 2020 published on Thursday 13th August, 2020 show that the printed issues appaled to the vast majority of the Czech population despite the consequences of the Coronavirus pandemic and the regulatory measures that were taken. Printed issues are read by more than 8 out of 10 Czech inhabitants between the ages 12 to 79. The overall reach of print is almost 84 % of population.

Daily papers and their supplements appealed to over all 64 % of the population. 77 % percent of Czech citizens between 12 and 79 years of age, i.e. 6,8 mil. people are regular readers of at least one magazine issued in the Czech Republic.

The overall summon of readers of all printed issues reaches almost 68 % of population between 12 and 79 years of age, circulation in daily papers and their supplements reaches almost 42 %, summon of readers of magazines issued reaches 58 % of population.

The group of daily papers remains stable and the chart of titles does not change in the long term. The most read nation-wide daily paper is Blesk (763 000 readers per issue), followed by MF DNES (479 000 readers) and Právo (207 000 readers).

Deník – a network of regional titles of the Vltava Labe Media publishing house has over all 465 000 readers per issue.

Blesk magazin TV (currently 995 000 readers) is the most read among the daily paper supplements, followed by the TV magazin with 765 000 readers.

Nation-wide daily papers:

	Summon of readers	CS
Blesk	763 000	153 031
MF DNES	479 000	97 875
Právo	207 000	59 698
Aha!	192 000	36 827
Lidové noviny	178 000	28 578
Sport	173 000	22 117
Hospodářské noviny	146 000	27 996

Source: http://www.unievydavatelu.cz/cs/unie_vydavatelu/medialni_data/vyzkum_ctenosti

(Summon of readers – readers per issue. CS – Average circulation sold in pieces)

Goal: The goal of this analysis was to find out whether in selected daily papers there are, respectively in what amount there are manipulative techniques that can have influence on the readers themselves and their understanding of the overall meaning of the printed news.

5. Basic findings

Table 1: Informing about the spreading of the Coronavirus in the Czech Republic and the most common manipulative techniques found in daily papers issued on April 18th, 2020.

Manipulative techniques	BLESK 21 articles on the topic of the Coronavirus	MF DNES 24 articles on the topic of the Coronavirus	PRÁVO 33 articles on the topic of the Coronavirus
Article invokes fear, resentment, hate. Overall negative framing of the article.	14x	13x	6x
The article soothes the reader	6x plus; 1x neutral	4x plus; 7x neutral	14x plus; 11x neutral
relativisation/generalisation	3x relativisation	9x generalisation	2x
Opinion of the author in the news	1x	2x	0x
ad populum (towards the crowd – everyone/all)	2x	6x	2x
Slippery slope / personalisation	1x	1x	2x
Negative verbs	3x	3x	2x
Number of quotations	18x	14x	33x

Source: own research

6. Verbal conclusion – evaluation of BLESK of April 18th, 2020

The first observed daily paper BLESK included the largest number of negative terms used, as early as on both the second and third page of the issue. Expressions like „tragedy in the hospital – pacient shot himself dead“, „fear of

infection“, „did not go to the doctor and died“, „doctors do not have“, „stroke attacks during Coronavirus“, „I suffer great pain“, invoke clear scepticism about the current situation in the reader. Negative expression in the headlines are furthermore highlighted in red and black colour and the omnipresent logo of the Coronavirus which was even waterprinted under the numbers of individual pages. All this invokes negative emotions arousing fear in the readers.

What is more, a paradox in the aforementioned headlines is the fact that after the reading of the complete article we learn that there is no relationship between the announced hospital tragedy – suicide of a patient in a hospital room – and the announced main topic – the Coronavirus.

In the second big article on page 3 (taking more than a half of the page's size) with a picture of a depressed patient on a hospital bed, we learn from the headlines that the patient is suffering great pain because of Covid-19. However, while reading the whole article we learn that this patient is suffering from a spinal disc herniation and is waiting for an upcoming operation.

We won't find positively toned articles on the Coronavirus up to pages 4 and 5, where there is information on raising the care-giver's allowance and payment of 25 000 CZK to sole-traders. But even here we find out about the big mistakes that sole traders make while filling in the applications. Only one sentence out of the half-page sized article emphasises when will this money be realistically paid out.

Even on page 5 we can see that optimistically toned news are immediately shrouded in negative mood. For illustration we can use a short article which refers about the healing process of one of the best known patients – the Prague taxi driver. The message is immediately supplemented with the fact that the nurse who took care of this patient in the Thomayer Hospital died due to the Coronavirus infection from this particular patient.

Even on page 14 of the Sports section of BLESK daily we can find manipulative techniques in an article about footballer Milan Škoda which refers about his support of colleague footballers while he expresses his opinion that even they should be able to apply for state compensations. Minister of Finance Alena Schillerová is not even quoted in the article. She is only assigned an expression, that sportspeople will be „threatened the Bolshevik way and the Financial Office will kneel them down“ if they apply for the state compensation allowance of 25 000 CZK. The following paragraph mentions the Minister's salary of 209 400 CZK, which has nothing to do with the footballer's appeal.

The specific quoted expressions create emotions: „fear discourages Czechs from their doctor's appointments“, „quarantine ends with quick-tests, but doctors do not have them“, „they're flat broke without the tourists“.

There are 18 quotations within the 21 observed articles. These persons are quoted:

Babeta Schneiderová from Bohemian Hostels says that, quote: „prices of hotels will drop“ – however, the reader will not get familiar with this person's position (is it a housekeeper, a cook, a manager or the general manager of the hotel...?); the press agent of the Motol hospital Pavlína Janková; repeatedly the Minister of Healthcare Adam Vojtěch, who is the only person in the whole newspaper whose age (33) is mentioned – for what reason: (attempt to show his incompetence for the office because of his age...?); music group member Jiří Holoubek; patient Milan Czaker; repeatedly the epidemiologist Roman Prymula; chairman of the General Practitioners' Association Petr Šonka; F1 presenter Luboš Procházka; Slavia's ex-striker Milan Škoda; „Sparta fan Lukáš Vácha“ – again, there is no mention of whether he is a footballer, a gardener or a fan of Sparta Praha.

The link to the following politicians on page 4 is not in the state of a direct quotation, but only some kind of direction towards them. Literally, they say „according to Maláčová's suggestion...“, „Yesterday, Schillerová has revealed...“ – but there is neither any mention of her position in the government of the Czech Republic, nor any other information concerning these ministers.

BLESK daily from April 18th, 2020 repeatedly did not mention the function of the quoted people in the observed articles. One could also see different ways of diminishing their authority: there was no mention of the ministers' department they are in charge of, not even their full name was mentioned, only their surname. The youngest minister had his age emphasised, which, however, had no connection with the topic.

7. Verbal conclusion – evaluation of MF DNES of April 18th, 2020

We can see several manipulative techniques on the very first page of MF DNES daily. A big photograph which depicts the return of astronauts is accompanied with a text that emphasises that they have landed on „planet COVID“. A statement in small letters later states that the crew of Sojuz MS-15, a Russian and two Americans, have landed in the Kazakh steppe.

The same event is reported on also by PRÁVO daily from April 18th, 2020 on page 17, where there is a similar photograph accompanied with a headline that says: „ISS crew in the landing module shortly after landing on Earth.“

Further examples of generalisation as a manipulative technique can be found in the MF DNES daily also on the other pages of this newspaper. E.g. on page 3 we can read that „*Experts are fearful*“, „*Experts are concerned*“ – without giving any specification of these experts.

The opening article of the Saturday issue of MF DNES includes a manipulative technique where the author's opinion is foisted on the reader. The description of the current situation about the Coronavirus infection in Belgium adds the opinion that „*Belgium's approach towards the infection is careless*“. This is based solely on the numbers of the currently infected per capita. Further examples can be found on page 3, which categorically states that: „*Trump has underestimated the situation*“, or that the „*Virus could easily return to Europe*“ – here without any explanation why.

On the other hand, in the interview with the Minister of Healthcare Adam Vojtěch we can see the manipulative techniques in the interviewer's question and the technique of grinding in the minister's answers. The reporter is speculating in her question „*why will the smaller shops open sooner than the bigger ones, where there is „logically“ more room*“. The logic that there is always more room in the bigger shops is not provable.

Another question, where the Minister of Healthcare is asked to say why he had bought protection equipment at a higher price than the Minister of the Interior, is not answered. He *grinds up* the whole topic by saying that the „*effectiveness of the FFP3 respirators is 99% and the effectiveness of the FFP2 only 95%*“. Further in the interview he states that he can „*handle the situation, which can be proved by hard data*“. However, the reader will not find another word about this data in the rest of the article.

Manipulative effect ad populum is traceable for example on page 4, where it is stated that: „*nobody can make a statement about it at the moment*“.

Manipulative technique *slippery slope* is possible to be found on page 6, where we learn that petrol stations are in danger. It is explained on the statement which says that: „*some buyers pay using an invoice and they pay with a delay*“. That leads to the assumption that „*now petrol stations will fall into insolvency towards their distributors, which will lead to their bankruptcy*“. However, there is no mention of how many customers pay using an invoice and what sums of money we are talking about. The whole story just begins with the words that „*some*“ pay with an invoice – that can be only two out of a hundred in the end, when we look at it also from the other side.

Specific stated expressions invoking emotions: „*the public took fright after the news*“, „*nobody can make a statement about it now*“, „*economic impacts frighten Czechs*“, „*we do not know what we will have to face next time – but it will probably not be anything nice*“.

There are 14 quotations within the 24 observed articles. These persons are quoted:

Epidemiologist Rastislav Maďar; Elias Nilsson – a businessman living in Stockholm, quoted in the introductory article of the whole newspaper, makes his statement on the situation in Sweden (however, we do not know his subject of business – is he a plumber, business owner...?); chairman of the Czech Medical Chamber Milan Kubek; Minister of Interior Jan Hamáček; Markéta Puci, spokesperson of the Ministry of Healthcare; Anton Molnár, spokesperson of Slovnaft; Pavel Kaidl, spokesperson of Unipetrol; Damir Durakovič, CEO of Axigon; Ivan Indráček, chairman of the board of directors of the Union of Czech Petroleum Independents; Jana Maláčová, Minister of Labour and Social Affairs; Tatjana Richterová, head of the Financial Administration of the Czech Republic. MF DNES repeatedly used the quotations from the individual departments' spokespeople.

8. Verbal conclusion – evaluation of PRÁVO of April 18th, 2020

There is obvious considerably more positive atmosphere in referring about the current state of emergency in the republic due to the Coronavirus. The big photograph on the front page shows a smiling face of the singer Ewa Farna who is singing in front of a retirement home in Bystřany in the Teplice district. BLESK daily also informed about this event, but no sooner than on page 9 where he dedicated exactly three sentences to it.

There are over all four reports on the front page – two of them are positively toned articles, and the other two are interviews. The first article informs the reader that the care-giver's allowance will be 80% and it will be paid also retroactively. The second article informs about a fresh father of a newborn who confides that despite the strict hygienic measures he was allowed to be present at the childbirth.

The front-page interviews show manipulative techniques in the answers of both respondents. For example Prime Minister Babiš says that „*the impact of the epidemic is devastating*“. However, he does not mention a single example. Furthermore, he advocates the government's steps on the basis of some „*sickness impact analysis*“, but we still cannot learn anything more about this analysis – who created it, what it concerned, who drew its conclusions, etc.

The follow-up of this interview on page three shows the manipulative technique of *relativisation* when the prime minister gives two examples in the defense of his government's steps: „*This makes noone happy and we definitely do*

not want to limit the basic human freedoms without a good reason, but this is a decision of the Ministry of Healthcare. “ – „*We would loosen the measures even sooner, if it were up to us, but the experts are very careful.*“

Manipulative element *ad populum* can be found on page 3 – „*All firms have a problem with it.*“ Despite the fact that there are businesses that made significant profit on the current situation. It depends on the business focus of individual companies (e.g. manufacturers of protection equipment, Rohlik.cz or grocery chains that fulfill their weekly plans as if it were Christmas – an increased number people in the Czech Republic now cook at home. This information is confirmed by Mr. Peffek, executive director of the company Penny).

On page 4 we read that: „*Scientists addressed by Právo daily all agreed...*“ . However, from the preceding text we cannot find out who exactly was addressed. Following expressions are used in this article: „*According to other scientists it is too early to evaluate the effects of the vaccine...*“ – not even here can we learn who is the announced other scientist. The conclusion of the article is toned in the same spirit, where it says: „*Experts keep adding that we still know very little about this new Coronavirus and it is too early for clear conclusions.*“ Again, we can only ask which expert is the author of this quote.

Specific expressions that create emotions: „*the debt per every Czech is steeply rising*“, „*sole-traders are in a hopeless situation*“.

There are 33 quotations within the 33 observed articles. These persons are quoted:

Repeatedly the Minister of Labour and Social Affairs, Jana Maláčová; Vladimír Dostálék of the press department at the Ministry of Labour; Petr Galáš, a father; Ministry of Industry and Trade spokesperson Štěpánka Filipová; Czech Bishop Conference spokesperson Monika Klimentová; Ecumenical Council of Churches secretary general Petr Jan Vinš; Škoda auto CEO Luboš Vlček; repeatedly Minister of Industry and Trade Karel Havlíček; Chamber of Commerce president Vladimír Dlouhý; deputy Minister of Healthcare Roman Prymula; Minister of Education Robert Plaga; personnel director of JUTA company Soňa Darvašová; owner of JUTA Jiří Hlavatý; Karel Drbal from the Department of Cell Biology at the Faculty of Science – there is no mention of the quoted person’s position (the reader can only speculate whether he is a doorman or a professor...); head of the Department of Genetics and Microbiology at the Faculty of Science of Charles University Ruth Tachezy; head of the Agricultural Association of the Czech Republic Martin Pýcha; chairman of the Vegetable Growers Association of Bohemia and Moravia Petr Hanka; chairman of the Fruit Growers Union of the Czech Republic Martin Ludvík; Minister of Finance Alena Schillerová, Financial Administration spokesperson Lukáš Heřtus; head of the Financial Administration Tatjana Richterová; head hygiene officer of Slovak Republic Ján Mikas; Barcelonian gynecologist Silvana Bonin; „Dr. Jesus Monllor“ – there is no mention of this person’s medical specialisation; Kazakh epidemiologist Ajžan Esmagambetova.

Právo is the only observed daily paper to quote foreign people in the analysed articles.

Minister of Industry and Trade Karel Havlíček is repeatedly the most-frequently quoted person, followed by the Minister of Labour and Social Affairs Jana Maláčová. There are also full-page interviews with Prime Minister Andrej Babiš and Deputy Prime Minister of Healthcare Roman Prymula in Právo daily.

It is also the only newspaper to quote a representative of the political opposition, namely the chairman of TOP 09 Representatives’ Club Miroslav Kalousek.

9. Final conclusion

The aim of the article was to find out how the media represents events with a nationwide overlap. Graphic processing of headlines, attached photos to newspaper articles can all evoke emotions in readers. And the reader has to take that into account when consuming media reports. How can the reader, viewer or consumer of media communication defend themselves against manipulative techniques from the media environment? It is absolutely essential to be critical of reading articles and commentaries in newspapers and of watching television reports. Especially today, in the age of the Internet, it is important to verify the data and not to believe the first report that social networks will be featured on the front page. It is crucial to verify information from multiple sources. It is also appropriate to submit any complaint to the Radio and Television Broadcasting Council in order to point out the infringement by the media. Last but not least, it is possible to act economically and stop removing/buying the medium. Even within television broadcasting, it is necessary to be an active viewer and not just a passive recipient of the created news. The remote control can be switched to another TV channel to make an independent comparison, as they report on similar events on other programmes (CNN, BBC, ČT24 and others..)

The main research questions of this thesis:

1. Do manipulative techniques appear in referring about the events with nation-wide reach in the main Czech daily papers?

2. If the main research question is confirmed, which manipulative techniques did the BLESK, MF DNES and PRÁVO daily papers use most frequently during a monitored period?

Three of the most read Czech journals were analysed as part of the research. Manipulative techniques appear in all of them. The most common manipulative technique was an appeal to fear, indignation, a clear effort to evoke negative emotions in readers. This occurs either by graphic processing of messages and subtitles, by selecting messages, by the attached photo documentation or by the phrase in the very text of the articles.

10. Further steps of the doctoral project

Considering the fact that the pre-research (media monitoring: April 18th, 2020) confirmed the presence of several manipulative techniques that appear in the leading Czech daily papers, an expansion of the monitoring time period will be applied. The author will monitor the analysed topic (informing about the Coronavirus situation in the Czech Republic and the World) in retrospective, too. Specifically from the beginning of March 2020 (informing about the first confirmed patient with COVID-19 in the Czech lands) up to the end of 2021, respectively until the end of the world-wide pandemic. Monitoring of bringing the news about the current topic in the leading Czech daily papers MF DNES, PRÁVO and BLESK will continue within the scientific grant.

Acknowledgements

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The Resilience in Leadership and Management and its Socio-Economic Impacts vs COVID-19 (Comparison according to the Behavior of Political Systems)

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Abstract

Resilience is a polysemous concept, it concerns all areas of the human being, even though there is no universally accepted definition of the concept; English is one of the languages that explained it; and many languages have adapted the term English for their own use. Resilience is dynamic starting with serious shocks in daily life, then the individual triggers mechanisms that lead them to resist, and to adapt, and to live a post-traumatic experience due to adversity to reach a higher operating level. For a hundred years, resilience has entered the scientific vocabulary, then in other disciplines and in the life of the whole world. After the Covid-19 epidemic no one can predict with certainty what the future will look like, heads of state and business should prepare in partnership with many scenarios recognizing the need for a long-term vision and 'an assessment of future possibilities based on respect for human life. This is the reason why the countries of the West and Southeast Asia have taken drastic measures to face this pandemic according to their political systems. In other countries of dictatorship, the slogan of resilience has always been lifted, at the same time as catastrophism is renewed with a total collapse of the ground. This article deals with the issue of resilience in the face of these threats from Covid-19 and wars against man and life, first as a concept, then in theory, and as practices across the world; the research is based on a methodology of analysis of statistics and of the content of the speeches, in a comparative way, of six groups of states, to produce a synthesis intended to serve the scientific contribution in this field.

Keywords: Socio-Economic Resilience, Covid-19, Leadership.

1. INTRODUCTION

The original term for resilience comes from the Latin verb *resilio*, ire, literally "to jump back", and in English (resilience). Source. CNRTL, which hence the verbs "rebound, resist" (to shock, to deformation), source Courtney Ackerman (2019). The French Larousse dictionary has defined resilience: the capacity of an individual to bear the proofs of life psychologically, a capacity that allows him to bounce back and make a new start after trauma. Source. Larousse. In psychology, Resilience is not a state of being (it cannot be acquired, it is a process to be put in place). Psychologically, it corresponds to understanding suffering. Any trauma generates such trauma. Source. www.doctissimo.fr. The term is introduced in France by Boris Cyrulnik: Resilience is the ability for an individual to cope with a difficult or stressful situation, he also presented resilience as "the art of navigating in torrents", the resilience can concern each of us one day, is the ability to succeed, to live, to develop despite adversity. He developed

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his definition of resilience: a process that takes place in some people allowing them to bounce back, to "be reborn" after a trauma or negative experience. Source. Boris. Cyrulnik (2009). The term has dealt with from the point of view of the individual's reaction and his feeling vs. stress. Every human being has its own feelings. When one lives a trauma, one is not necessarily traumatized. It is a question of making a difficulty, a misfortune an opportunity of awakening, of growing up. Source. www.stresspsychotherapie.fr/resilience. Marc AURELE summed up resilience: My God, give me the courage to accept what I cannot change, the strength to change what can be, the wisdom to dissociate one from the other. To become resilient, it is good to appeal to the opportunities present in a problem on the one hand and our capacities on the other. Source. www.chercheursdebonheur.com.

The word resilience according to the Sensagent dictionary generally refers to the ability of an organism, group, or structure to adapt to a changing environment. Resilience is a term used in psychology to refer to an individual's ability to take the measure of physical or psychological trauma to successfully overcome it and rebuild, move forward. Source. Dictionnaire. Sensagent (2012). Stefan Vanistendael defined resilience as the ability of an individual or group to overcome very great difficulties and grow in life. It can be trauma, extreme poverty, serious illness, severe grief, or other issues. Source. bice.org/fr. Greene & All have defined resilience: a biopsychosocial and spiritual phenomenon, involves a dynamic transactional process of person-environment exchanges, includes a process of adaptation of the quality of the adjustment, occurs throughout life with individuals / families / and communities experiencing unique developmental pathways. Source. Greene & all (2004). Kim-Cohen, J. (2007) defined: Resilience is a "superordinate" construct indirectly deduced from two concepts underlying its definition: exposure to risk and "good" adaptation. Source. Kim-Cohen. J. (2007). Finally, when conferences or seminars or study days were convened to ask researchers to discuss the concept or the nature of resilience, all agreed that resilience is complex as a construction. This is the reason why, resilience can have different meanings between people, communities, businesses, cultures, and society. They also agreed that people might be more resilient at one point in their life, and less at another, and that they might be more resilient in some areas of their life than others. Source. Steven M. Southwick & all (2014). Resilience would therefore be made possible and appear durable thanks to the early structuring of the well-trained personality to live in different lifestyles, by constructive experiences pre-acquired from childhood before being confronted with potentially traumatic facts, and sometimes by courageous reflection, or by speaking, more rarely by medical supervision of therapy.

2. Research Objectives, Main idea & Problematic

2.1. Research Objectives

The main objective of this paper is to shed light on the concepts of Socio-Economic Resilience and Adaptation Between Covid-19 & Risk of War in Western Countries vs Middle East. And the sub-objectives are such:

- 1.Introduce the methodology to address this topic,
- 2.Enlighten applied models,
- 3.Comparisons between countries using this approach,
- 4.Proposes a practical model for Socio-Economic Resilience and Adaptation.

2.2. Main idea

- * Academics agree on the great importance of Socio-Economic Resilience and Adaptation.
- * Scientific transfer their intellectual productions to institutions to meet the needs of society.
- * The methodology used for Socio-Economic Resilience & Adaptation relies on highly qualified people to lead the project of world sustainable development.
- * Socio-Economic Resilience & Adaptation helps to successfully complete the project of world sustainable development.
- * This research proposes a practical model of Socio-Economic Resilience & Adaptation.

2.3. Problematic

This paper addresses the following issues and questions:

- What are the successful models when applying the Socio-Economic Resilience and Adaptation?
- Who are the actors in the successful project of Socio-Economic Resilience and Adaptation?
- How to develop and implement a practical model of Socio-Economic Resilience and Adaptation?

3. The theoretical framework

The theoretical framework based on the objectives; the problematic of research schematizes as the following:

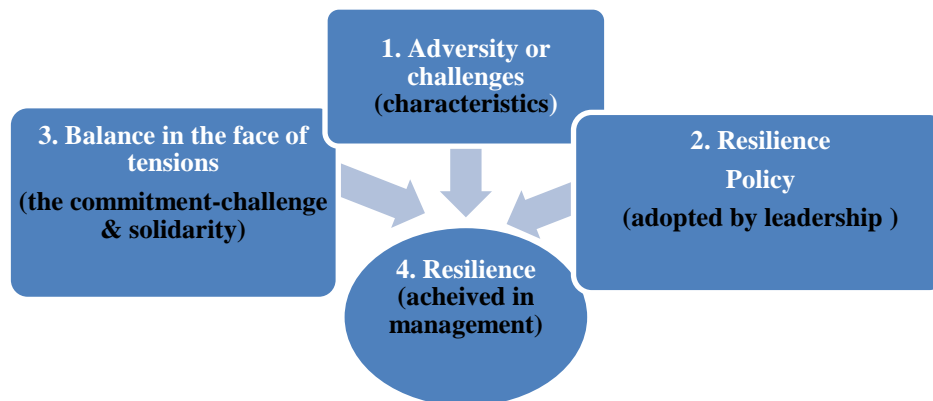


Figure .1 shows the theoretical framework.

4. Methodology

The methodology followed to achieve this paper is the exploratory and applied qualitative method, where the data sources, researches and studies already published either by researchers or professionals working in the field of Socio-Economic Resilience and Adaptation, in order to draw scientific results We made qualitative analyzes of the data collected to extract results, as well as present practical models of Socio-Economic Resilience and Adaptation applied in developed countries by making descriptive comparisons with the dictatorial states (confessional & tribal) in the Middle -Est countries . All this has enriched the experience of Socio-Economic Resilience and Adaptation and helped to propose a practical model which presents the (Socio-Economic Resilience and Adaptation).

5. The origins of the concept of resilience

The two approaches (Francophone and Anglophone) that have addressed the concept of resilience present quite different and controversial backgrounds while being influenced by the culture and methodology of each of them.

5.1. The origins of the Anglophone approach to the concept of resilience

According to the Anglophone approach, the term first originated in the fields of materials science and environmental studies, and then broadened to include resilience in individuals. Source. Alastair McAslan (2010). In education, the first definitions referred to “invulnerable children” in their inappropriate environment and who live in difficult situations. Source. Garmezy, N. (1974). Norman Garmezy defined resilience as “resilience is designed to reflect the ability to recover and maintain adaptive behavior that may follow initial setback or disability upon onset of a stressful event”. Source. GARMEZY, N. (1991a). Suniya Luthar et al. (2000) defined resilience as “a dynamic process encompassing positive adaptation in a context of significant adversity”. Source. LUTHAR, S. Set al (2000). Werner, E. E., & Smith, R. S. (1989). Michael Ungar said: “In the context of exposure to significant adversity, whether psychological, environmental or both, resilience is the ability of individuals to orient themselves towards sustaining resources. health, including opportunities to experience feelings of well-being and a condition. Source. UNGAR. M. (2008). Resilience is seen as an important characteristic of personality, conducive to good health and a 'key to it' and, as such, can also be seen as a 'meta-source' of special regulatory power, influencing the activation of others the

necessary resources to deal with life events. Source. Ogińska-Bulik, Juczyński (2011). Ann Masten in 2014, defined resilience as: "The ability of a dynamic system to resist or recover from significant changes that threaten its stability, viability or development. Source. MASTEN, AS (2014). Mandie Shean mentioned: resilience can be operationally defined as the adolescent's and community's belief that the adolescent has experienced risk and is showing positive outcomes (both signs of competence and lack of psychopathology) according to cultural expectations and community context Source: Mandie Shean (2015).

5.2. The origins of the Francophone approach to the concept of resilience

According to the Francophone approach, originally, resilience is a term used in physics which characterizes the energy absorbed by a body during a deformation ("Charpy test"), The definition of the Georges Charpy test, again commonly referred to as the "resilience test", was over 100 years old (in 2001). From the outset, it was a question of characterizing the behavior of metals in an impact bending test on notched bars. G. Charpy helped to make the test quantitative and reproducible and developed the corresponding test machine. In literatures, André Maurois in his novel "Lélia ou la vie de Georges Sand" wrote: Force morale; quality of someone who is not discouraged, does not let himself be defeated. In this mourning, once again, she astonished her friends by her immediate resilience. Source Maurois. André (1952) Lélia, 1952, (1982). At the end of the 90s, Boris Cyrulnik publicized the concept of resilience in Psychoanalysis, based on the observation of survivors of concentration camps and then of various groups of individuals, including children from Romanian orphanages and Bolivian children from the street. Source. Boris. Cyrulnik (2009). Jean-Pierre Polydor (2009), In the field of human or natural disasters, assistance to communities in the event of such disasters (natural or man-made), we also speak of resilient communities. The post-immediate assistance process for people affected by a critical event generally has a psychosocial dimension. Source. Polydor. Jean-Pierre (2009).

6. Types of resilience

Scientists and Experts group the types of resilience into four main types, which work together to strengthen the strengths of people facing catastrophic situations, be it socio-economic, health, environmental or war.

6.1. Personal Resilience

Personal resilience is based on a person's ability to continue to live physically and mentally, to function, to develop and to flourish after a trauma or a disaster experienced by himself. This personal resilience is about main elements (vision, self-awareness, organization, interaction) in relation to secondary elements (self-confidence, determination, relationship, problem solving) while considering (Personal control over oneself, Personal control over responses to people, Personal control over responses to events) as shown in the following figure.

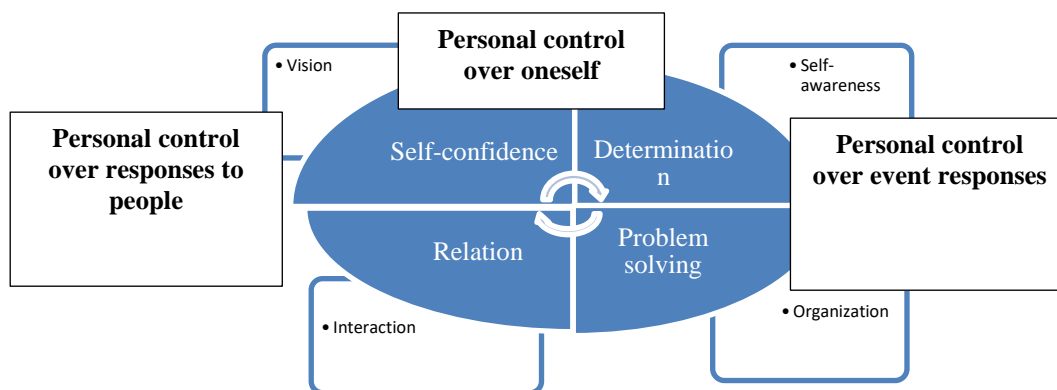


Figure.2. Shows the elements of personal resilience.
Source. Mowbray. Derek (2011), Adapted.

6.2. Community resilience

Community or (collective) resilience is the ability of a community to continue to live, function, develop and adapt after trauma or disaster. A resilient community is a group of people organized to adapt quickly to change, overcome trauma, while maintaining cohesion and open relationships with the rest of the world. Man is a social being, closely linked to his entourage, who organizes himself in a group, he can be exposed to personal traumas (loss of a loved one, illness), or also to external events, which can affect his community as a natural or environmental disaster or economic shock or impact of war threatening civilians. The skills and qualities that make up community resilience are shown in the following figure:

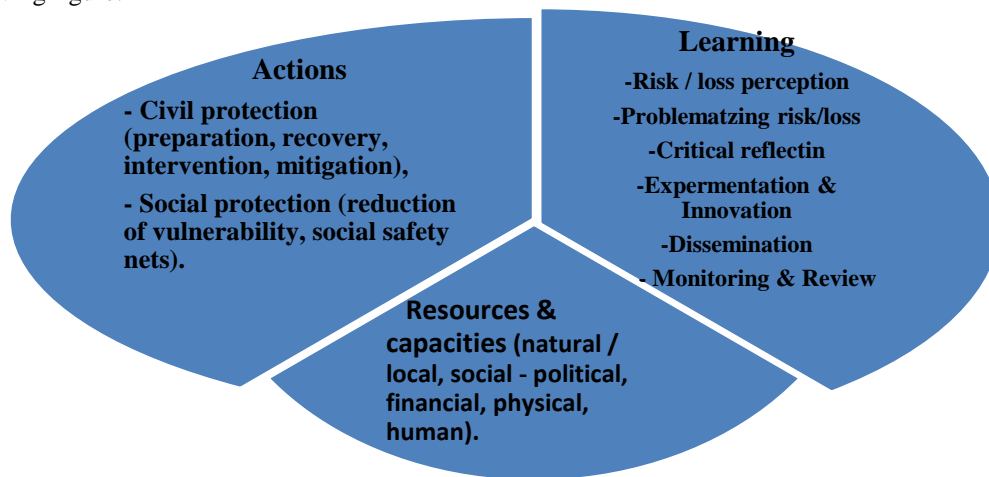


Figure .3. Shows the skills and qualities that make up community resilience
Source. Barrott. Julia (2016), Adapted.

6.3. Organizational resilience

Organizational resilience is the ability of an organization or business to continue to live, operate, develop, and adapt after trauma or disaster. Organizational resilience is not seen, but rather it is the product of the integration of good organizational practices. Organizational resilience is shown as the following figure.



Figure .4. Shows organizational resilience.
- Organizational resilience as good organizational practices
Source.Barone.AnthonyA.(2020,Adapted.

6.4. Social or (national) resilience:

Social or (national) resilience is the ability of a society / nation to continue to live, function, develop and adapt after trauma or disaster affecting part or all that society / nation. Trauma or disaster affects components of society such as (Individuals: people; interpersonal: families, friends, social networks, organizations: schools, organizations, institutions; Community: relations between and intra-community; Society: politics, culture, Standards, ...). Social resilience is presented as illustrated by this following figure.

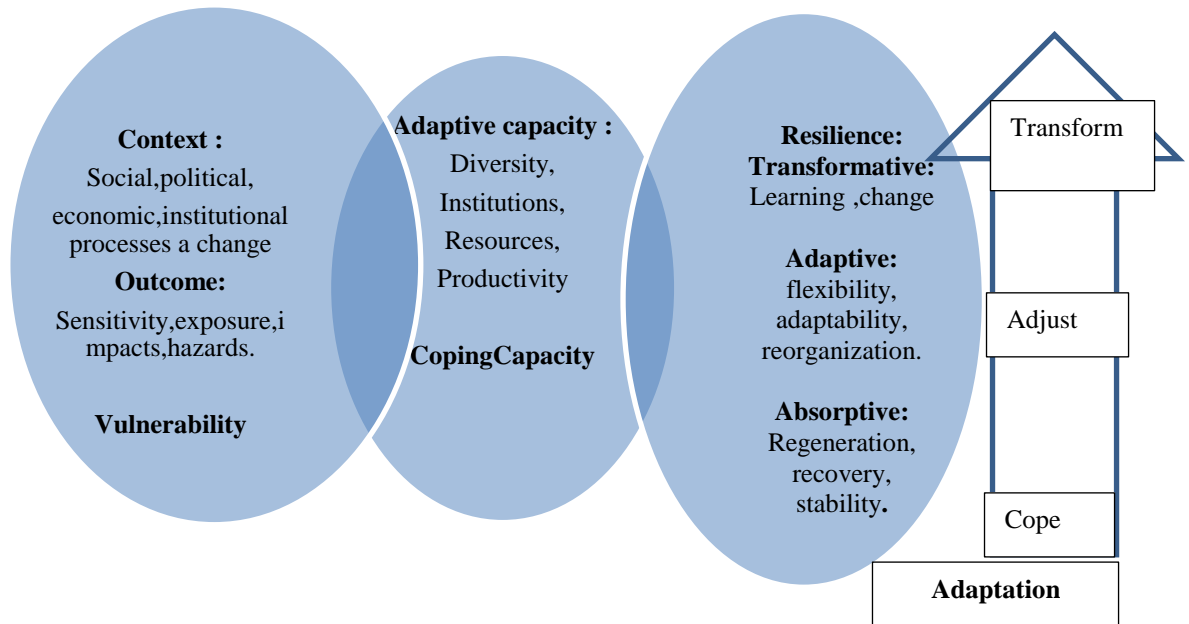


Figure.5. Illustrates social resilience
Source. Jami L. et al (2014), Adapted.

7. Models of resilience (Examples)

Scientists and practitioners have used different terms to distinguish the three categories of resilience models which essentially describe the same mechanisms for the impact of stress and adversity on personal / community / organizational and social adjustment.

7.1. ABC model of Resilience

This model is based on the work of Albert Ellis (2015) who presents a process of: (A: adversity, B: Beliefs, C: consequences) as shown in the following figure.

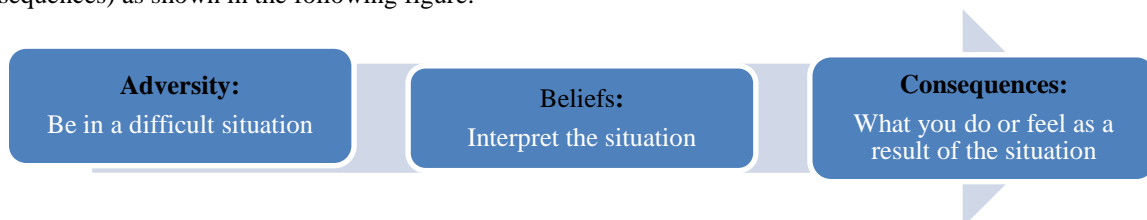


Figure.6. Show the ABS model of resilience
Source. Ellis. Albert. (2015), Adapted.

7.2. Laurie Leitch's Social Resilience Model -TGW (SRM)

This model presents the timely capacity of individuals and groups (family, community, country, and company) to be more generous in times of stability and to adapt, reorganize and develop in response to disturbances as presented by the following figure.

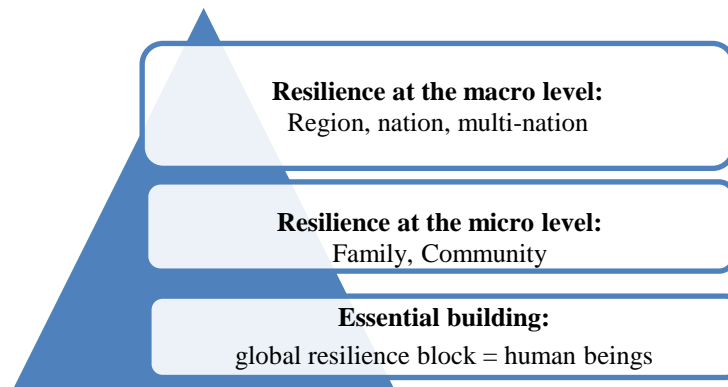


Figure. 7. Presents the social resilience model.
Source. Leitch. Laurie (2011), adapted.

8. Finding

8.1. Resilient models of leadership and management of the VUCA method practiced during crises (Covid-19) "statistics analysis".














These are comparative statistical data, concerning the impacts on human health of Covid-19, updated as of November 30, 2020, according to the country / group of countries.

The coronavirus pandemic (Covid-19) appeared in Wuhan, China on November 17, 2019. For a year (the human, economic, social and cultural damage) has been enormous as shown by these statistics which cover the period "November 17 2019 - November 30, 2020".

Table.1. Shows the list of countries classification is based on the Country codex (Report coronavirus cases update live).

Table.1. Presents Dictatorial regimes (military, sectarian, tribal

Country	Countries groups	Populations	Total Cases	Total Deaths	Rate = mortality Covid-19 / populations
			30.11. 2020 Update: 30.06.2021	30.11. 2020 Update: 30.06.2021	30.11. 2020 Update: 30.06.2021
Country groups	(Dictatorial regimes (military, sectarian, tribal) practicing "data disinformation: real data is at least multiplied by 50")				
Russia	military regime	145,934,462	2,242,633 ?	39,068	1,33%
			Update: 5.081.417	X50 = 1 953 400	Update: 4,19 %
				Update: 121.873x50= 6 093 650	
China	military regime	1,439,323,776	86,501 ?	4,634	2,08%
			91.122	(30,000,000)	+ 2,08% ???
				(Chinese study) 4.636 (30,000,000)	

 Iran	Sectarian regime	83,992,949	935,799 ?	47,486x50=	2,82%
			2.923.823	2 374 300	4,78 %
				80.327 x 50=	
				4 016 350	
 Syrie (Assad regime)	Sectarian regime	12,000,000	7,635 ?	404x50=	0,16%
			(14,000,000) Refugees	24.495	20 200
				1.770 x50 =	
				88 500	
 Iraq	Sectarian regime	40,222,493	548,821 ?	12,200x50=	1,51%
				1.201.467	610 000
				16.375 x 50 =	
				= 818 750	
 Venezuela	military regime	28,435,940	101,524 ?	888x50=	0,15%
				234.165	44 400
				2.646 x 50 =	
				132.300	
N. CORIA	military regime	NO DATAS	NO DATAS	NO DATAS	NO DATAS
 Cuba	military regime	11,326,616	8,110 ?	133x50=	0,05%
				142.266	6 650
				958 x50 =	
				47 900	
 Belarus	military regime	9,449,323	133,324?	1,143x50=	0,60%
				994.439	57 150
				2.851x 50=	
				142 550	
 Kazakhstan	military I regime	18,776,707	130,039?	1,990x50=	0,31%
				387.672	59 750
				3.974 x50=	
				198 700	
 Azerbaijan	military regime	10,139,177	109,813?	1,291x50=	0,63%
				333.956	64 550
				4.913 x50=	
				245 650	
 Uzbekistan	military regime	33,469,203	72,582?	608x50=	0,09%
				100.495	30 400
				690 x50=	
				34 500	
 Kyrgyzstan	military regime	18,776,707	71,971?	1,262x50=	0,60%
				105.111	113 100
				1.815 x50=	
				90 750	
 Tajikistan	military regime	9,537,645	12,082?	86x50=	0,04%
				13.308	4 300
				90 x50=	
				4 500	
 Saudi Arabia	Tribal regime	34,813,871	356,911?	5,870x50=	0,84%
				450.436	293 500
				7.362 x50=	
				368 100	
 Kuwait	Tribal regime	4,270,571	142,195?	875x50=	1,02%
				309.222	43 750
				1.772 x50=	















				88 600	
 Qatar	Tribal regime	2,881,053	138,477?	237x50=	0,41%
			217.458	11 850	0,96% ?????
				556 x50=	
				27 800	
 Oman	Tribal regime	5,106,626	122,579?	1,391x50=	1,36%
			218.271	69 550	2,30% ??
				2.356 x50=	
				117 800	
 Bahrain	Tribal regime	1,701,575	86,515?	341x50=	1,00%
			240.531	17 050	2,87% ??
				980 x50=	
				49 000	
 UAE	Tribal regime	9,890,402	166,502?	569x50=	0,28%
			572.804	28 450	0,84% ??????
				1.680 x50=	
				84 000	
 Lebanon	Sectarian regime	6,825,445	123,982?	980x50=	0,71%
			540.388	49 000	5,66%
				7.729 x50=	
				386 450	
 Egypt	military regime	102,334,404	114,832?	6,608x50=	0,32%
			262.650	330 400	0,73% ??????
				15.096 x50=	
				754 800	
 Libya	Tribal regime	6,871,292	81,273?	1,153x50=	0,83%
			186.072	57 650	2,27% ??
				3.127 x50=	
				156 350	
 Algeria	military regime	43,851,044	80,168?	2,372x50=	0,27%
			128.913	118 600	0,39% ?????
				3.472 x50=	
				173 600	
 Sudan	military regime	43,849,260	16,864?	1,215x50=	0,13%
			35.512	60 750	0,30% ?????
				2.631 x50=	
				131 550	
 Palestine	military regime	5,101,414	81,890?	704x50=	0,69%
			308.732	35 200	3,43%
				3.503 x50=	
				175 150	
 Afghanistan	military regime	38,928,346	45,966?	1,752x50=	0,22%
			72.981	87 600	0,38% ?????
				2.974 x50=	
				148 700	

Table.2. Presents Countries with populist governments.

Country groups	(Countries with populist governments)				
 USA Trump	populist govt	331,002,651	13,454,346	271,029	0,08%
			34.113.146	609.767	0,18%
 UK Johnson	populist govt	67,886,011	1,589,301	57,551	0,08%
			4.487.339	127.782	0,18%
 Brazil	populist govt	212,559,417	6,238,350	171,998	0,08%













Bolsonaro			16.541.674	467.966	0,22%
 Italy	populist govt	60,461,826	1,538,217	126.128	0,08%
			4.217.821	53,677	0,20%
 Hungary	populist govt	9,660,351	204,708	29.761	0,04%
			804.712	4,516	0,30%
 India	populist govt	1,380,004,385	9,354,426	331.909	0,009%
			28.175.044	136,267	0,02%
 Turkey	populist govt	84,339,067	548,244	47.527	0,01%
			5.249.404	13,191	0,05%
 Mexico	populist govt	128,932,753	1,090,675	223.568	0,08%
			2.413.742	104,873	0,17%
 Poland	populist govt	37,846,611	973,593	73.856	0,04%
			2.872.868	16,746	0,19%
 Czech Rep	populist govt	10,708,981	515,984	30.119	0,07%
			1.665.617	7,967	0,28%
 Slovakia	populist govt	5,459,642	104,632	12.353	0,01%
			389.866	798	0,22%
 Bulgaria	populist govt	6,948,445	139,955	17.700	0,05%
			418.577	3,680	0,25%
 Austria	populist govt	9,006,398	275,661	10.615	0,03%
			645.577	3,018	0,11%
 Greece	populist govt	10,423,054	101,287	12.095	0,02%
			402.306	2,102	0,11%
 Philippines	populist govt	109,581,078	427,797	21.012	0,007%
			1.235.467	8,333	0,01%

Table.3. Presents Countries: the governments are in an electoral & political crisis








Country groups	(Countries: the governments are in an electoral & political crisis)				
 France	Elec political crisis	65,273,511	2,196,119	109.528	0,07%
			5.667.324	51,914	0,16%
 Spain	Elec political crisis	46,754,778	1,646,192	79.953	0,09%
			3.678.390	44,668	0,17%
 Belgium	Elec political crisis	11,589,623	570,829	24.955	0,14%
			1.062.001	16,339	0,21%
 South Africa	Elec political crisis	59,308,690	781,941	56.506	0,03%
			1.665.617	21,378	0,09%
 Portugal	Elec political crisis	10,196,709	285,838	17.025	0,04%
			849.093	4,276	0,16%
 Israel	Elec political crisis	8,655,535	333,802	6.412	0,03%
			839.483	2,839	0,07%
 Switzerland	Elec political crisis	8,654,622	318,290	10.810	0,05%
			695.496	4,596	0,12%

Table.4. Presents Countries with self-disciplined populations

Country groups	(Countries with self-disciplined populations)				
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Japan	self-disciplined populations	126,476,461	139,491	13.048	2,051	0,001%
			746.713			
S. Korea	self-dis-populations	51,269,185	33,375	1.963	522	0,001%
			140.799			
Taiwan	self-dis-populations	23,816,775	648	137	7	00%
			8.842			
Singapore	self-dis-populations	5,850,342	58,205	33	28	00%
			62.069			
New Zealand	self-dis-populations	4,822,233	2,050	26	25	00%
			2.673			
Thailand	self-dis-populations	69,799,978	3,966	1.069	60	00%
			162.022			
Australia	self-dis-populations	25,499,884	27,885	910	907	0,003%
			30.118			
Vietnam	self-dis-populations	97,338,579	1,341	47 ?	35	00%
			7.324			
Hong Kong	self-dis-populations	7,496,981	6,124	210	108	0,001%
			11.849			

Table.5. Presents Countries with self-disciplined populations

Country groups	(Countries with participatory decision-making)					
Germany	participatory decision-making	83,783,942	1,027,325	89.148	16,172	0,01%
			3.689.918			
Sweden	partici decis-making	10,099,265	243,129	14.413	6,681	0,06%
			1.068.473			
Denmark	partici decis-making	5,792,202	78,354	2.516	823	0,01%
			281.227			
Finland	partici decis-making	5,540,720	24,307	956	393	0,007%
			92.642			
Norway	partici decis-making	5,421,241	35,193	783	328	0,006%
			125.116			
Netherlands	partici decis-making	17,134,872	508,866	17.623	9,267	0,05%
			1.649.460			
Canada	partici decis-making	37,742,154	359,064	25.547	11,894	0,03%
			1.381.582			

Table.6. Presents Other Countries (some examples)

Country groups	EX. (Other Countries)					
Moldova	(Dictatorial)	4,033,963	104,140	6.107 ?	2,250x50=112 500	2,7%
			255.186			
Peru	(Populist)	32,971,854	958,324	69.342	35,839	0,10%
			1.955.469			
Chile	(Electo & politi crisis)	19,116,201	547,223	29.300	15,278	0,07%
			1.384.346			

Indonesia	Self -discip populations	273,523,615	527,999	50.724	16,646	0,006%
			1.826.527			0,01%
Lithuania	partici decis-making	2,722,289	58,212	4.276	482	0,01%
			274.776			0,15%

Source. virusncov.com COVID-19 Coronavirus - Last updated: 2021-05-31, Author's calculations.

8.2. Country groups: practicing the Vuca method in leadership & management VS Covid-19 (Practices).

By using the content analysis methodology (speeches, speeches, press conferences, situation briefs, etc.) of leaders or managers of health administrations in countries affected by Covid-19; and statistics announce or hidden (contamination, hospitalization, resuscitation, deaths) of the populations of the countries in the world; we summarize these countries by their attitudes and their acts accomplished in groups such as:

8.2.1. Countries with dictatorial regimes

Table.7. Shows the Vuca Method of leadership & Management VS Covid-19 by Countries with dictatorial regimes.

Countries with dictatorial regimes		
Leadership & Management VS Covid-19		
<ul style="list-style-type: none"> - Russa Putin - China Jinping - Iran Khamenei - Syrie Assad - Irak Malki - Venezuela Maduro - North Korea Kim Un - Cuba Castro - Belorussia Loukachenko - Caucasian country - Arabian golf dynasties -All Arabic Countries. etc... 	<ul style="list-style-type: none"> - Volatility: (No Vision) (Dictatorial political regime is not interested in the lives of its people). - Uncertainty: (Non-Understanding) (The political regime entrusts its faithful (non-competent & non-expert) with the task of leading the crisis). - Complexity: (No Clarity) (Political regime considers that any national affair is a state secret to perpetuate it domination). - Ambiguity: (No Agility) (Political regime manages the affairs of the state like a family farm supervised by a mafia group). 	<ul style="list-style-type: none"> - Disinformation of statistical data about (contamination, hospitalization, resuscitation, deaths). - Prohibition on communicating facts about health under sanction. - Underdeveloped health infrastructure in hospitals - Unqualified healthcare staff - Kill Covid-19 patients, especially opponents of the regime. <p>The decision and the solution of the crisis are only in the hands of the country's Leader as (God, prophet, Chief, doctor, savior ,...).</p>

8.2.2. Countries with populist governments

Table.8. Shows the Vuca Method of leadership & Management VS Covid-19 by Countries with populist governments.

Countries with populist governments		
Leadership & Management VS Covid-19		
<ul style="list-style-type: none"> USA Trump UK Johnson Brasil Bolsonaro Italy Salvini Hungary Orbán India Modi Turkey Erdogan Mexique AMLO 	<ul style="list-style-type: none"> - Volatility: (Ideologic Vision) (The government is interested in its ideological current interests). - Uncertainty: (Populist Understanding) (The government entrusts its ideological faithful (unidimensional competent) with the task of leading the crisis). - Complexity: (No Clarity) (The government considers that any national affair must serve the 	<ul style="list-style-type: none"> - Ignorance of the risks of statistical data about (contamination, hospitalization, resuscitation, death). - Control communications concerning public health by populist media. - Health infrastructure developed in hospitals, but with low efficiency. - Qualified health personnel but managed by demagogic state leaders.

Poland Kaczynski République tchèque Babiš Slovaquie Fico Bulgarie Ataka Autriche Strache Grèce Syriza Philippines Duterte etc...).	nationalist and populist ideology to perpetuate its domination). - Ambiguity: (Intentioned Agility) (The Government manages the affairs of the state like an ideological clan supervised by a populist group).	The decisions and the solutions of the crisis are in the hands of the populist and demagogical leaders of the country as (protector of the country, super - leader, savior...).
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8.2.3. Countries: the governments are in an electoral and political crisis

Table.9. Shows the Vuca Method of leadership & Management VS Covid-19 by Countries: the governments are in an electoral and political crisis.

Countries: the governments are in an electoral and political crisis		
	Leadership & Management VS Covid-19	
France Macron, Spain Sánchez Belgium (Flanders / Wallonia conflict) South Africa Cyril Ramaphosa Portugal Marcelo Nuno / Duarte Rebelo de Sousa Israel Netanyahu -etc	- Volatility: (Electoral Vision) (The government is focusing on its current and upcoming electoral interests). - Uncertainty: (Understanding depends on electoral gains) (The government entrusts to its political faithful (one-dimensional competent) the task of leading the crisis). - Complexity: (Semi-clarity) (The government considers that any national affair must serve its electoral success to perpetuate its authority). - Ambiguity: (Agility of opportunistic power) (The government manages the affairs of the state as political and electoral gain and must be overseen by a group in power).	- Contradictory speeches & decisions from the leaders regarding the Covid-19 crisis. - Sub evaluating the impact of statistical data about (contamination, hospitalization, resuscitation, death). - Confront communications concerning public health through faithful media. - Health infrastructure developed in hospitals, but with low efficiency. - Qualified health personnel but managed by managers for electoral benefits. The decisions and the solutions of the crisis are in the hands of the leaders in power of the country as (protector of the country, super-leader, elected officials,).

8.2.4. Countries with self-disciplined populations

Table.10. shows the Vuca Method of leadership & Management VS Covid-19 by Countries with self-disciplined populations.

Countries with self-disciplined populations		
	Leadership & Management VS Covid-19	
- Japan - South Coria - Singapore - New-Zealand - Thailand - Australie - Taiwan - Vietnam - Hong Kong -etc	- Volatility: (Vision of personal awareness) (The government focuses on the conscience, and the human values of the people, present and future). - Uncertainty: (understanding depends on the human values of the people) (The government gives responsible leaders (competent and experts) the task of leading the crisis). - Complexity: (Total-clarity) (The government considers that any national affair must serve the nation and does everything to protect it). - Ambiguity: (Agility management)	- Clear presentation of statistical data about (contamination, hospitalization, resuscitation, death). - Encourage communications concerning public health through all media. - Health infrastructures are developed in hospitals, with high efficiency. - Qualified health personnel, managed by competent managers to protect the nation. Decisions and solutions to the crisis are in the hands of all partners, with a

	(The government manages the affairs of the state as a servant of the nation and must protect it from all danger).	personal responsibility and conscience, the leaders in power are at the service of the nation.
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8.2.5. Countries with participatory decision-making

Table. 11.shows the Vuca Method of leadership & Management VS Covid-19 by Countries with participatory decision-making.

Countries with participatory decision-making		
Leadership & Management VS Covid-19		
- Germany - Sweden -Denmark -Finland -Norway - Switzerland - Netherlands - Canada -etc	- Volatility: (Participative Vision) (The government focuses on the values of the human being, to protect his life and his destiny). - Uncertainty: (understanding the needs of human) (The government gives responsible leaders (competent and experts) the task of leading the crisis). - Complexity: (Total-clarity) (The government considers that any national affair must serve the nation and does everything to protect it). - Ambiguity: (Agility management) (The government manages the affairs of the state as a servant of the nation and must protect it from all risk).	- Publish with Clarification the statistical data about (contamination, hospitalization, resuscitation, death). - Facilitate communications concerning public health through all media. - Health infrastructure is developed in hospitals, with high efficiency. - Health personnel is qualified and managed by competent managers to protect the nation.
		Decisions and solutions to the crisis are participatory with the social partners, a personal responsibility and a conscience manifested, the leaders in power are at the service of the nation.

8.2.6. Other Countries

Table.12. shows the Vuca Method of leadership & Management VS Covid-19 by Other countries

Other countries.		
Leadership & Management VS Covid-19		
Each of the other countries follows a different model of leadership & management VS Covid-19 depending on the influence of the categories already mentioned	- Volatility: Vision - Uncertainty: understanding - Complexity: clarity - Ambiguity: Agility	- About statistical data (contamination, hospitalization, resuscitation, death). - About communications concerning public health through the media. - About efficiency Health infrastructure in hospitals. - About performance of Health personnel.
		Decisions & solutions to the crisis are taken by the leaders in power.

8.3. Effects of Leadership & management models of the VUCA method practiced during crises by Countries group (Covid-19, Wars, Climate change)

Table.13. Shows the Effects of Leadership & management models of the VUCA method practiced.

Countries group Leaders Culture (Variables)	Effects: Economical	Effects: Political	Effects: Social	Effects: Cultural	Effects: Environmental
Countries with dictatorial regimes	economic collapse	Political repression	Disguised social conflict	Lack of culture	Environmental deterioration
Countries with populist governments	Economic regression	Political division	Social conflict	Cultural demagogy	Ignorance of the environment
Countries: the governments are in an electoral and political crisis	economic fragility	Political struggle	social separation	Cultural weakening	Environment as a slogan
Countries with self-disciplined populations	contained economic development	political stability and homogeneity	Social cohesion	Identity strengthening	Environmental Protection
Countries with participatory decision-making	economic development	Political stability	Social cohesion	Cultural reinforcement	Environmental Protection+ Sustainable development
Other countries	The other countries have been impacted by the crises in term of the models followed of leadership and management of Covid-19 according to the influence of the categories of countries already mentioned.				

8.4. Socio-economic resilience and adaptation vs. covid-19, risk of war in (Dictatorial Middle Eastern countries).

After the Second World War and the creation of the Warsaw Pact which brought together the Soviet Union and Eastern European countries, certain third world countries and specifically (Arab and Middle Eastern countries ruled by confessional and tribal dictatorships) followed this political and ideological current, raising a slogan: (the resilience and the confrontation of capitalism, imperialism, and Zionism). Indeed, this slogan remaining until our days was a kind of deceiving the peoples who lived in these countries to distort the concepts; to defame information and to numb peoples living in political - scientific unconsciousness, in order to perpetuate the domination of the leaders of these countries, to impose a political system of (republican dynasties - heirs) on their children after their death, pillar national fortunes and control them to seize military-political and economic powers at the same time. For decades in the countries of dictatorship, the slogan of (resilience) has always been raised, at the same time catastrophism has been renewed around the concept of total collapse, gaining ground among practices devoted to political and socio-economic reality. This is a permanent paradox, over time, between developer leaders (in the West and in democratic countries) and destructive leaders (countries of dictatorships and confessional or tribal mafias / bands). All sectors will necessarily be affected if collapsology were to take place, it will destabilize governments and destroy socio-economic and environmental life. Military dictatorships (Arabs or Middle East) in countries that have been at constant war for decades are the best examples. Source. Meri.Mohammed (2020).

8.4. 1. The resilience of military dictatorships in the countries of the Middle East

The system of countries in the Middle East (dictatorial, and military countries based on confessional and tribal powers) is in a phase of transition, if not in permanent crisis. Institutions have collapsed, civil and proxy wars are ravaging both the center and the periphery of the region, and the rift between rulers and governed has grown wider than ever, and despite all this these countries claim resilience and the confrontation of imperialism and Zionism and continue to lift this slogan throughout their rule. In this context, the fallout from the crises taking place in the region, in (Syria, Iraq, Lebanon, Libya, Afghanistan, Iran, etc.) illustrate the growing interdependence between European and

global security and the Mediterranean and the Middle East. security issues that need to be addressed, because security is a issue that requires global responses. More generally, the accounts of the collapse present chains of reactions (crises> shortages> wars> crimes> deaths> emigration> displacement, etc. = Resilience?) As mechanical phenomena when they depend on socio-political factors (evolution) that must consider. Let us take the example of (Syria, Lebanon, Iraq, Libya, Iran,) the problem is to present these situations as illustrations of collapses whatever the cause and / or violence, since it is a question of comparing what could "happen to us" in terms of political adaptation with the bombings, the shootings and voluntary torture. Source. Tie. Jeremiah (2019). Communitarianism / confessionalism or tribalism is a system of overproduction based on the extraction by a confessional / tribal minority of the added value provided by the work of most other communities / denominations, and on the fact that this minority has means and authority and production (armed forces / intelligence and capital services, etc.). Source. Murray. S.C. (2017).

8.4.2. Resilience as denominational / tribal dimensions of dictatorial state structures

Examples of management and its faith-based or Confessional/tribal organizations in dictatorial countries and their power structures are indicative as follows: Source. Balanche. Fabrice (2010).

1- Syria: the colonial power founded (the army of the East) which was composed of members of religious minorities: (Alaoui, Druze, Ismailis) excluding the societal majority (Sunni, Christian), and it was the same for (the secret services). source. Seurat. Michel (1982). On the other hand, banking, educational, commercial organizations, unions, etc., all were formed by (the Sunni majority and the Christian).

The population at the time of independence in 1946 was represented: (Sunni: 70%, Christians: 16%, Alaoui: 10%, Druze 3%, Ismailis 1%). After the withdrawal of the colonial forces, conflicts broke out between these privileged minorities of the colonial power on the one hand and the societal majorities on the other hand, in the organs of the armed forces and the intelligence services. Then perpetual conflicts started between (the minorities themselves) to seize power, which led to internal civil wars (either hidden during the 1950s, 60s) or declared (seventies, eighty, four -twenty, two thousand, and one war since 2011). Source: Oualdi. M'hamed, & all (2012).

The Alawi confessional minority which represents 10% of the Syrian population monopolizes 90% of the positions of officers of the army and of the intelligence services (the command of all the military brigades and regional and departmental administrations and branches of the country's secret services, 80% of foreign affairs and diplomacy positions, 70% of director and staff positions in the ministries of petroleum, finance, economy and banking, transport, information and media, education 50% of posts for education teachers and other ministers in the country). Omran Center for Strategic studies (2020).

The collapsological impact of confessional power in Syria has been a hellish war since 2011: the country's population in 2010 was 23 million. The results of the war unleashed by the Assad regime and its allies against the people are: One million dead: 90% of deaths by the massacres and bombings of the Assad regime in confessional power and its Russian and Iranian allies and their Shiite militias, 10% of the victims killed by armed Islamist groups (Daesh, Nusra, etc. as well as Kurdish armed groups); over (2) million disabled and mutilated people, (7) million refugees outside the country, (7) million people displaced from their homes and lands. Sources. UNHCR Reports, 2019/2020, HRW Reports.

As well as the destruction by the Assad regime and its Russian and Iranian allies of the majority of the country's infrastructure (60% schools, 50% universities, 80% hospitals, 80% factories, 50% roads, 80% bakeries, airports, 70%% shops, 60% mosques and churches). Sources. UNHCR Reports, 2019/2020, HRW Reports.

2- Lebanon: the colonial power imposed a confessional constitution made up of 18 confessions, shared by the leaders of these sectarian groups (key and effective positions: armies, security and intelligence services, parliament, administrations, and state bodies). The civil war has not ceased for the decade (50, 70, 2000, etc.). The population at independence was represented (Christian: 40%, Sunni: 30%, chi'ite 25%, Druze 5%).

Iran, in the decade of the 1990s, in cooperation with the authority of (Hafez El Assad, then president of Syria), imposed armed chi'ite militias named (Hezbollah), militias totally of the Shiite faith, who dominated the country and seized all power (political, military, security, economic, information and media, transport and finance and economy, etc.).

The collapsological impact of confessional powers is that the wars which have been renewed since 1958 until today are: 80% of the population is emigrated or immigrated, the majority of these migrants were and are confessions (Christians, Sunnis, Druze) while the chi'ite by their denomination are steadily increasing due to the secret naturalization imposed by Iran and its militias in Lebanon, the largest state debt in the world in relation to the population, the participation of the militias from chi'ite Hezbollah to all the wars in Iraq, Syria, Yemen, etc. for the

benefit of Iran which it finances, great poverty in the country,...), and finally the fire at the port of Beirut in July 2020 which devastated the districts of the capital in the Sunni and Christian districts. Source. Meri.Mohammed (2020).

3- Iraq: The colonial power imposed a dynastic power coming from the region of Hedjaz (Mecca), and created structures of armies, intelligence services, educational administrations, banks, political parties, unions, associations were all based on confessionalism, favoring confessions (Sunnis, Christians) to the detriment of other communities (chi'ites, Kurds). The population at the time of independence was represented: (Shiite: 35%, Sunni 35%, Kurdish 25%, Yazidis and Christians and others: 5%) Confessional power dominated by the Sunnis led to coups d'état successive, then eternal conflicts over the decades (60, 70, 80) between the communities in postcolonial power and the Kurdish community, then bloody and permanent conflicts between all the communities (Sunnis, chi'ites, Kurdish, Yezidi, Christian) during decades (90, 2003 after the US invasion and its allies, and so far). Source. Luizard. Pierre-Jean (2015).

The collapsological impact of confessional power in Iraq has been represented by a bloody and contained war since 1963, and the worst social fraction was made after 2003. The country's population in 2003 was 30 million. After the war: 2.4 million dead: (655 Miles by American and Allied bombing) and (1.8 million civilian casualties by the Iranians and their Shiite militias). SOURCE. "Opinion Research Business in UK", As well as some of the victims killed by Islamist groups (AL Kaida, Daesh); plus, 2 million disabled and mutilated people, 6.5 million refugees outside the country, 4.5 million people from Sunni areas displaced from their homes and lands. Sources. UNHCR reports, 2019/2020 As well as the destruction by the USA and its allies, by Iranian and chi'ite militias, by Islamist groups Al kaida and Daesh, of most of the infrastructures existing in the Sunni regions (schools, universities, factories, roads, bakeries, airports, shops, mosques, and churches ...). Sources. UNHCR reports, 2019/2020.

4- Libya: The colonial powers (Italy, United Kingdom, USA) imposed on the Dynasty (Idris Al Sinousi) and its tribe to reign over a State semi-divided into three regions, and to play a role of link between the Maghreb and the Mashreq of the Arab world. After the discovery of oil and the attempts of large international forces to dominate the country, a small officer (Qadhafi) with small military colleagues carried out a coup and seized power. For 40 years, Kaddafi imposed a family and tribal military dictatorship which reigned over everything: (army, intelligence services, economy, finances, foreign policy, all Libyan administrations). The country and its people lived in constant scarcity and poverty while Gadhafi's family monopolized the country's fortunes. After the Arab Spring, the Libyan people revolted and led a bloody popular revolution against the troops of Kaddafi and his African militias.

The collapsological impact of Gadhafi's military family and tribal power in Libya is represented by bloody battles waged against revolted individuals and civilians. The country's population in 2010 was 6 million. The results of the wars of Gadhafi and these militias, and of the parties to permanent deadly conflicts are: 200 miles killed and 656 miles refugees and displaced from their homes and lands. Source. "HRW.ORG.World Report 2019". As well as the destruction of the majority of the country's infrastructure (schools, universities, hospitals, factories, roads, airports, ports, shops, etc.). The figure below explains the understanding of the origin of migrants (children and young people) and their capacities adapt with the new hard, catastrophic, and perhaps prospect less life.

5- Iran: After the First World War, the winning countries imposed the Shah (Rida Bahlawi) as emperor of Iran to play a role of terror and police in the Middle East. This Shah and his heir son (Mohamed Reda Bahlawi) played their role outside of border Arab countries (Iraq, Arab Gulf States, Kurds of Iran, etc.) and in interior by oppressing the peoples of Iran and plundering the national fortunes of the country. The poverty of the peoples of Iran, the terror of the secret services and the exceeding of the predefined limits by the protectorate countries the Shah regime all this encouraged the states united as a force protecting the regime to let go, by preparing Shiite groups chaired by Ayatollah Khomeini to replay the same role of the Shah, even with other ideology (Shiite and Persian Islamist). The impact of the Khomeini regime on life in Iran is disastrous at all levels (political, socio-economic, cultural, environmental, international relations, etc.). This Impact is manifested by Shiite confessional power in Iran which was represented by a bloody war with Iraq of 1980-1988, then contained in other countries (Lebanon, Syria, Yemen, etc.), and by a worse social fraction (chi'ite anti Sunni, chi'ite anti Christians, Persia anti-Arab/ anti lori/ anti guilaki/ anti baloutchi/ anti mazandarani/ anti kachkai/ anti Kurd/ anti Azéri, etc.) all this was done after 1979 and the arrival Khomeini in power. The country's population in 1979 (37,237,144) and (83,024,745 million inhabitants in (2018). Emigration from Iran to the West over 300,000 Iranians have emigrated each year. Source. The United Nations High Commissioner for Refugees (UNHCR).

The war caused by Khomeini against Iraq took its toll: some 680,000 dead and missing (85% of those killed were combatants), 1.82 million wounded and maimed. The financial cost of the war was exorbitant: 1,100 billion dollars. Source. www.milkipress.fr (2016). Poverty in Khomeini Iran is very high, according to the report (CSDHI. Org) about

38.31% of populations (between the population Sunni Muslim). As for the poverty line for a rural household in Tehran and Alborz provinces, it is (376 euros) per month. For underprivileged villages such as those in Sistan-Balochistan province, it is (173 euros). Source: Les Droits de l'Homme en Iran, (2019). In contrast, the loss in human and economic capital paid after the Khomeini came to power is well illustrated by another study by MIT, Iranian scientists and engineers own or control assets in USA of nearly \$ 880 billion. Source. /fr.wikipedia.org/wiki/Diaspora_iranienne.

8.4. 3. The plans of resilience and confrontation of imperialism in the countries of dictatorships (confessional and tribal) in the Middle East

These countries of dictatorships (confessional and tribal: Syria, Iraq, Lebanon, Iran, Libya, etc.) in the Middle East, raising its slogan: "the resilience and confrontation of imperialism and Zionism", they carried out the " establishment of their military-political authorities, then economic by the plundering of national fortunes, by implementing secret plans based on social cleansing and demographic change, with a view to achieving a homogeneous society (confessional or tribal) as announced several times (Bashar Al Assad from Syria, Nouri Al Maliki from Iraq, Hassan Nasrallah from Lebanon, Khomeini and Khamenei from Iran, Gadhafi and his successors from Libya, etc.). These plans implemented permanently, by the forces of their armies, the secret services, and the militias loyal to the powers, which assumed the responsibilities of horrifying, capturing, killing, and emigrating and forcibly displacing the components of the non-loyal and non-confessional / tribal peoples. The (homogeneous societies) are currently the results of crimes against humanity committed by these sectarian and tribal regimes of dictatorial countries in the Middle East. Unfortunately, these plans are considered by the leaders in the powers of these countries as equivalent to the resilience plans of the countries of the West (European Union, North America, Japan, etc.). The disastrous effects are:

- Kill more than a million from each country by the armies of these criminal regimes,
- To mutilate more than two million of each country by the bombs thrown on the innocent populations,
- Hunt and necessarily emigrate 14 million / 23 million in Syria; 15 million / 25 in Iraq; ½ of the population in Lebanon; 25% of the people of Iran, 1/4 of the population of Libya, from their homes to impose homogeneous societies. Source."HRW.ORG.World Report 2019.

8.4.4. Political and socio-economic impact and development

The impact of organizational structures and confessional or tribal management on the socio-economic and political development of those countries concerned is:

- Legal and political impact:

The countries of military dictatorships (confessional and tribal) mark the total absence of political life and real institutions, parliamentary practices, and the rule of rights and citizenship such as: (True political parties, parliaments, applied constitutions, elections of all sorts).

- The organizational and managerial impact:

The countries of military dictatorship (confessional and tribal) have created administrations attached to the armies and the intelligence services, which they operate according to the directives of these confessional and tribal entities, to serve the mafia family and sectarian or community power. Source. Maroun. Salma (2013).

- The socio-economic impact:

The societal fabrics of the countries of military dictatorship (confessional and tribal) have been torn apart and the social divide which has affected all components of society due to the confessional policy imposed by the power represented by the armies and the intelligence services which control any source of power.

The harmful consequences of this confessional and tribal policy based on corruption and plundering of national fortunes and people and belonging to external protectors have been revealed by the total monopoly of the confessional economy (mafia) by collaborating with (the clergy religions, and the "nouveau riche" named businessman).

This economic monopolization has made the economy of these countries of military dictatorship (confessional and tribal) unproductive and dependent exclusively on the interests of confessional / tribal leaders and their allies.

The wars and conflicts regenerated almost every ten years in these countries have affected everyone and especially the countries of Europe through forced emigration and waves of refugees. Source. Mohammed Meri (2020).

9. Practical Models proposed

After months of suffering and panic over the world, one thing is clear: No one can predict with certainty what the post-COVID-19 future will look like. Heads of state as well as of companies should prepare themselves with partners for many scenarios of possible futures. As the Covid-19 have turned pandemic, a group of scenario planners and futurists have recognized the need for a long-term view of the current situation and an assessment of future possibilities.

9.1. The DELOITTE CONSULTING LLP Model

DELOITTE CONSULTING LLP and Salesforce presented four Scenarios in “The World Remade By COVID-19: Scenarios for Resilient Leaders”.

The scenarios explored several fundamental uncertainties, which could have a significant impact post- COVID-19.

Table. 14. Shows the impact of Covid-19 according to the scenarios

Scenarios	Storm Who passed	Good company	Sunrise in the east	Lone wolves
Impacts				
Society (Social cohesion)	Increases, with appreciation of interpersonal & family relationships	Sustained, society evolves to become more "goal driven"	Shifts to an increased focus on the "good for the whole".	Fall, xenophobia, and distrust of others become the norm
Technology (Technological advances)	Staying the course, as former resistance fighters move in line	Take center stage, with large companies providing solutions in areas such as healthcare technology and biotechnology	Accelerated, as more data sharing enables advancements, and other advanced technological capabilities	Divergent between different markets, an emphasis on the progress of surveillance and control measures
Economy (Global economies)	Entering a protracted recession, with increasing income inequality	Disrupted, with an increasing concentration of power between large corporations	Shrinkage, due to the prolonged nature of the virus	Left in turmoil, as global supply chains are disrupted
Environment (Focus on change Climatic)	Renewed, because global collaboration gives hope for progress	Mixed, companies concerned with sustainable development investing in renewable energies	Neglected because economic recovery is a priority	Declines, as countries move towards energy independence
Policies (Governments of the whole world)	Gain confidence & international organizations (WHO) gain relevance	Partner with large companies, which participate in the solution	Look East for Guidance as Asian Countries Cope Effectively with Virus	Adopt isolationism, as they try to contain the virus

Source. Andrew Blau, Jen Steinmann (2020), adapted.

9.2. European Union: crisis management and solidarity

In these times of crisis, the countries, regions and cities of the European Union are extending a helping hand to their fellow citizens in the EU and providing aid to those who need it most by donating protective equipment such as:

(masks, dispatching medical teams, offering cross-border treatment to patients and repatriating Union citizens stranded abroad).

Upon request, the European Commission coordinates aid in the fight against the COVID-19 pandemic, such as the provision of personal protective equipment and repatriation flights from countries outside the EU, and co-finances the provision of assistance and transport of medical teams from one country to another.

With its Emergency Response Coordination Center, the Commission stands ready, 24/7, to help any country, in Europe and beyond, that requests it. To date, the Emergency Response Coordination Center has received a total of 54 requests for assistance:

- 7 from EU member states,
- 3 states participating in the EU Civil Protection Mechanism,
- 2 from international organizations,
- 40 from third countries.

Requests for assistance from 22 countries (Albania, Armenia, Bangladesh, Belarus, Bosnia and Herzegovina, China, Croatia, Ecuador, El Salvador, Estonia, Georgia, Greece, Italy, Kenya, Lithuania, Moldova, Montenegro, Netherlands, North Macedonia, Serbia, Spain, and Ukraine) received a partial response with offers. Source: European Commission, rescEU factsheet, 02 June (2020).

European recovery plan to finance the post-COVID-19 ecological transition.

As part of its post-Covid-19 recovery plan, the European Commission is putting 750 billion euros on the table in the form of loans and grants. An unprecedented opportunity for the 27 Member States to finance their ecological transition. Faced with the crisis, the President of the European Commission has chosen to be ambitious, proposed before the European Parliament this Wednesday, May 27, 2020, a budget of 750 billion euros to help the 27 Member States finance the economic recovery. Called Next Generation EU, this financial instrument is supported by 500 billion euros in grants and 250 billion in loans. It will complement the Union budget for the period 2021-2027, bringing the total financial capacity of the EU to € 1,850 billion. Not to mention the 540 billion euros that the European Union has already deployed as an emergency and the 1 trillion euros that the European Central Bank (ECB) has committed to injecting into the financial system. For the first time in its history, the Commission is proposing to borrow on its behalf the 750 billion euros on the financial markets and to sell them through already existing funding programs or through new channels. In terms of research, an amount of 94.4 billion euros will strengthen the Horizon Europe program to finance research activities, essential in the fields of health, resilience, and ecological and digital transitions. Source: Roussel. Florence (2020).

9.3. Practical Model proposed

The practical model proposed is schematized by the following:

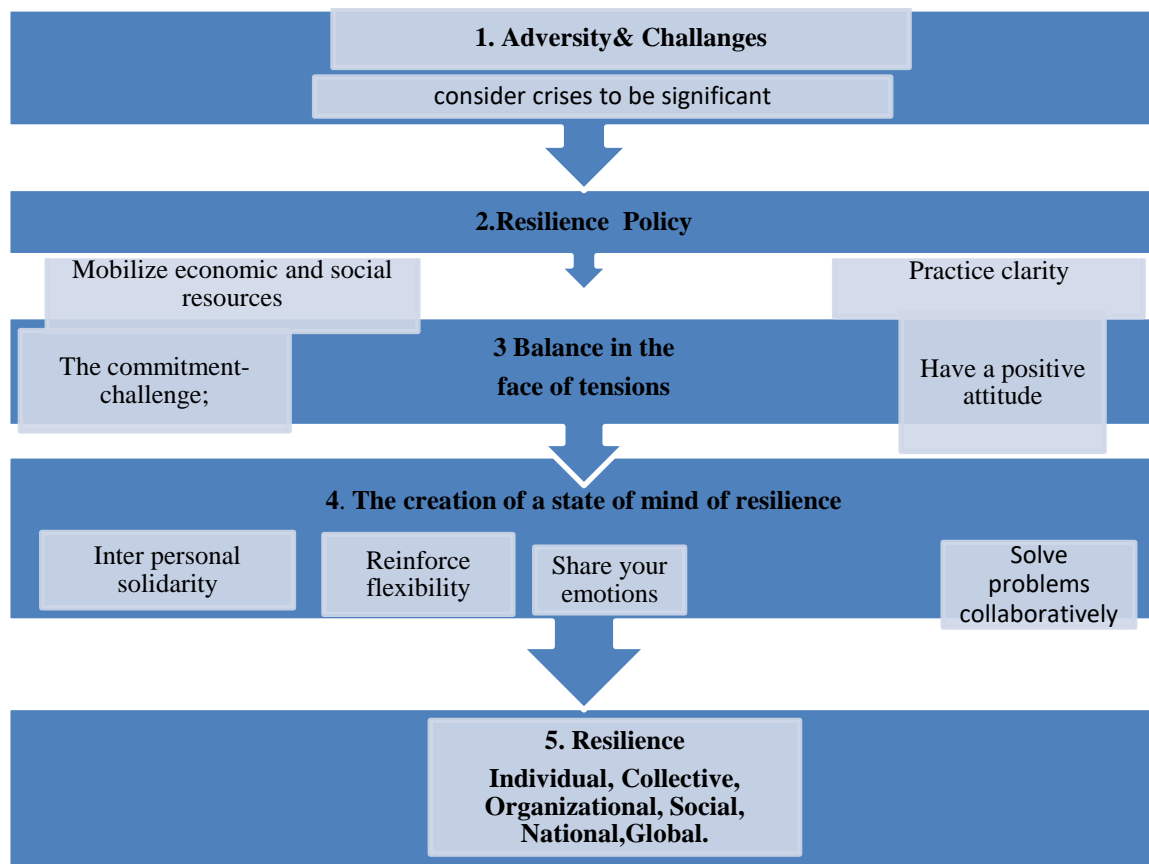


Figure. 9.shows the proposed practical model

Conclusion

Global news makes large-scale traumatic events more frequent, and the term resilience is often used to refer to people / communities, organizations or societies undergoing reconstruction. To face all kinds of adversities or challenges, it is necessary to:

- Consider the magnitude & dangers of adversity and the challenges imposed on humans and nature.
- Consider a well-prepared policy in partnership with all the actors concerned (clear and mobilizing all resources).
- Balance existing competencies in relation to the tensions faced (real commitment vs. challenges and having positive attitudes).
- Create a state of mind of resilience for all concerned (interpersonal solidarity, strengthening flexibility, sharing emotions, solving problems together).
- There are multi-levels resilience: personal, community, organizational, social, national, global.
- Scientists and practitioners invented several types of resilience according to their disciplines, expertise's, and cultures.
- The resilience in the democratic countries is for their peoples and for sustainable development.
- The resilience in the dictatorial and confessional / tribal countries is for the domination of their governors and not their peoples and sustainable development
- Celebrate the resilience achieved jointly at the individual, collective, organizational, societal, national level).

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Does Market Orientation Predict Financial Performance in Micro, Small and Medium-Size Enterprises?

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Abstract

This study aims to investigate the effect of market orientation on financial performance. We explore market orientation and financial performance of companies, which operate in technology parks (TPs) in Poland. Because little is known about how MSMEs in different types of technology parks in Poland can build and sustain competitive advantages from market orientation. In this study, it was expected that the market orientation encompassing two overt marketing behaviors, i.e. market information acquisition and market information dissemination in an enterprise, is an expected financial performance stimulus. Results of the study were obtained by analysing data collected from 185 enterprises. The statistical results reveal that market orientation has a significant impact on financial performance. The important role of the predictor - market orientation, in shaping the results of micro, small and medium-sized enterprises operating at TPs in Poland has been proven. The predictor demonstrates statistical significance in explaining their financial performance. In practice, this means that increasing the level of market orientation is conducive to increasing positively assessed financial performance. Moreover, in a situation where the financial performance of a specific enterprise is higher than that achieved by its competitors, the market orientation can be treated as an organizational factor of achieving a competitive advantage measured by financial performance. Our research contributes to strategic management and emerging market literature by identifying the key role of market orientation for companies wishing to benefit from different types of strategic orientations. These studies have some limitations. First, the sample is not representative, and the findings of this study cannot be generalized to the entire population of enterprises operating in TPs in Poland. Second, we do not explore possible conditions underlying (or affecting) the market orientation – financial performance relationship.

Keywords: market orientation, financial performance, micro, small- and medium-size enterprises (MSMEs)

An Exploratory Factor Analysis of the Emotional Motivation of Administrative Staff in Private Universities; Conghua Region, Guangzhou City, China

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Abstract

The purpose of this research is to analyze the key elements of the emotional motivation of administrative staff in private universities in the Conghua region of Guangzhou City, China. This research was the survey research and development. The data were collected by using questionnaires. The participants in this study were administrative workers from six private universities in the Conghua region of Guangzhou City, totaling 420 persons. Cronbach's Alpha coefficient was 0.945 overall, indicating high internal reliability. The data were analyzed using the statistical analysis of frequency, percentage, mean, and standard deviation, and the exploratory factor analysis method. Results of the study showed Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was 0.566 and Bartlett's test of sphericity Chi-square was 19142.782. The elements could be analyzed as eight elements or namely "8s model". All elements had a range of values of eigenvalue from 1.17 to 13.615 and had cumulative variance of 75.72 percent at a statistical significance level of 0.05.

Keywords: Emotional motivation, Administrative staff, an exploratory factor analysis (EFA)

1. INTRODUCTION

The "Hundred Years Education Plan" has always been an important policy for China's development. Since the end of the 20th century, with the continuous development of China's education, private universities have also developed rapidly across the country. By the end of 2017, there were 747 private universities nationwide (Liu Xin & Xu Yanhua, 2019). According to the interpretation of the Ministry of Education of the People's Republic of China (2019), as of the end of 2019, there were 747 private colleges and universities, accounting for 28.6% of the total number of ordinary colleges and universities in the country, with 6,284,600 students, accounting for 27,535,900 students in ordinary colleges and universities nationwide 22.8% of people. In order to attract more students to enroll, most private colleges and universities have invested a lot of manpower, material resources, and financial resources in infrastructure to improve teaching facilities and campus environment. After the infrastructures have been rapidly improved, the connotation construction of teaching managements and school qualities have become the keys to the current development of private universities. The management of private universities has Dominate the priority of the entire teaching system, and the quality of management directly affects the future development of private universities. As the core part of the operation and management of colleges and universities, the administrative management of

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colleges and universities has close ties to the faculty and students of them. It also affects the overall quality and educational level of private colleges. It is the key to the operation whether private colleges are normal and efficient.

Administrative administration is critical to the activity of all private colleges and universities because it provides fundamental assurance, comprehensive coordination, and a bridge link. The survival and development of the universities are closely related to the administrative level of them. The main undertakers of the administrative management of private colleges and universities are the administrative personnel of private colleges who are fighting on the front line. The quality and efficiency of the administrative personnel of private colleges are closely related to the quality of the entire private colleges' education operations. As a result, administrative staff at private colleges and universities can be seen to play an invaluable role in supporting and ensuring the routine growth and execution of school education, science research, and other activities. However, whether it was compared with the administrative staff of public colleges and universities or the full-time teachers of private colleges, the administrative staff of private colleges were far from the above-mentioned groups in terms of welfare, salary and promotion space. Additionally, the country's high-quality resources were more concentrated on public colleges and universities, and the salaries of private colleges were more inclined to full-time teachers. This had to a large extent lead to the relatively weak structure and management level in private colleges. Due to many shortcomings, such as complex administrative tasks, high work pressure, low social status, imperfect evaluation mechanism, and low emphasis on the basic administrative management tasks, the administrative staff of private colleges and universities often had low work enthusiasm, low work efficiency, and perfunctory work. As previously mentioned, the lack of effective measures to stimulate the administrative management team in private universities severely impedes the development of these institutions. Furthermore, a well-qualified management staff, in addition to excellent teachers, is needed to increase the overall teaching standard of private colleges and universities.

2. RESEARCH OBJECTIVE

The main objective of this paper is to analyze the key elements of the emotional motivation of administrative staff in private universities in the Conghua region of Guangzhou City, China.

3. LITERATURE REVIEW

In 1976, Campbell and Pritchard explained motivation from the relationship of variables: "motivation must study the relationship between an organization's independent variables and dependent variables. This relationship is related to people's intelligence, skills, and understanding of tasks. And under the condition that the various constraints in the environment remain constant, it can explain the direction, range and continuity of a person's behavior (Kampel & Pritchard, 1976)." Robbins mentioned in the book "Organizational Behavior" published in 1979: "We define motivation as the willingness to achieve organizational goals through high-level efforts, and such efforts can satisfy certain needs of individuals. As a condition (Robbins, 1979)." He mainly defines motivation from the role of motivation, and regards the impact of motivation on people's wishes as a condition for the realization of motivation. John A. Wag Ner wrote in the 1992 "Organizational Behavior Management" textbook: "motivation is to explore the factors that influence people's behavior to trigger, direct and maintain (Wagner & Hollenbeck, 1992)." This is the initial definition and understanding of motivation by early scholars. Although they boldly put forward their personal views on motivation, their understanding of motivation is still at the preliminary stage, and they lack a comprehensive understanding of motivation.

At the beginning of the 21st century, according to Herzberg's theory, the comprehensive motivation includes external motivation and internal motivation. External motivation is formed by the pulling force at the material level, while internal motivation is formed by the spiritual needs and internal driving forces of employees (Harold Kunz & Heinz Werik, 2003). In addition, emotional motivation belongs to the internal motivation. Although their distinction between emotional motivation and external motivation is still not obvious, they have essentially given a preliminary and appropriate explanation for emotional motivation. In 2010, Researchers further turned to the exploration of internal factors, paying more attention to the role of emotional motivation. According to He Haixia (2010), emotional motivation means that after managers pay attention to external management rules, they have a deep understanding of the employees' inner world, and know about their happiness, anger, sorrow, and joy. Through

communication, care, respect, trust, and Support, etc., enable them to get a pleasant emotional experience, to enhance the relationship between employees and the organization, and stimulate employees' enthusiasm and creativity at work (He Haixia, 2010).

Concepts of emotional motivation: according to Herzberg's theory, comprehensive motivation include external motivation and internal motivation. External motivation is motivation formed by the pulling force at the material level, and internal motivation are the motivation formed by the spiritual needs and internal driving forces of employees (Harold Kunz & Heinz Werik, 2003). Internal motivations are more durable and stable than external motivations. Material motivation produce material-level pulling forces, which are external motivation. Spiritual motivation meets people's spiritual needs, and emotional motivation meet people's inner emotional needs, both of which belong to internal motivation. Researchers believe that the implementation of emotional motivation is to strengthen emotional communication with employees, by improving the working environment and conditions, reducing the intensity of work, paying attention to the sufferings of employees, caring about the needs of employees, making employees feel warm, and always maintaining a good mood, to stimulate employees' enthusiasm for work and attachment to the group. What it advocates is to create a good interpersonal environment with emotional people, to be reasonable, and to use emotional appeal to stimulate the enthusiasm and creativity of the faculty and staff, so that they can work hard with full enthusiasm, enterprising spirit and attitude.

Concepts of private Universities: according to the interpretation of the Ministry of Education of the People's Republic of China (2007), private colleges and universities refer to colleges and other educational institutions run by enterprises, institutions, social groups, and other social organizations and citizens who use non-state financial education funds for the society. Private universities include private undergraduate universities and private colleges.

Concepts of administrative staff: in a narrow sense, the administrative personnel refer to the personnel in the national administrative organs who are the administrative subjects and represent the country in exercising administrative power and engaging in administrative activities. In addition to the above-mentioned administrative personnel, the broad concept also refers to all managers who are not directly involved in front-line operations such as production, sales, and procurement in factories, mines, companies, and other independent business units that are not administrative agencies. Therefore, they are often referred to. Known as administrative staff. The administrative personnel of colleges and universities are those who are engaged in administrative management of colleges and universities. According to the different types of personnel, arrange them to engage in management work in the scientific research, teaching, and personnel departments of universities. At the same time, it is possible to uniformly manage the management staff by compiling classification (Liu Dongmei, 2019). In summary, the administrative personnel of private colleges and universities are mainly managers engaged in front-line operations. In other words, the administrative personnel are the most basic employees in the administrative management system.

Concepts of executive leader: an executive leader refers to a person who is responsible for planning, organizing, commanding, and coordinating leadership functions in administrative organizations at all levels. It is the key factor that determines the cohesion and charisma of the administrative system, and it is also the key to whether the ecological efficiency of administrative leadership is effectively exerted (Shang Zhe & Liu Jie, 2013).

4. RESEARCH METHODOLOGY

The study was designed to analyze the key elements of the emotional motivation of administrative staff in private universities in the Conghua region of Guangzhou City, China. The methodology of this survey and development research can be described as follows.

4.1 How to select the research area and data providers: The research population was composed of administrative staff of six private colleges and universities in Conghua region, Guangzhou. Due to the relatively high mobility of administrative staff in private universities, in order to ensure the real-time data, the researchers found out the number of administrative staff in each university by asking the relevant personnel of the human resources department of each university. Specifically: 195 people from Nanfang college of Sun yat-sen University, 162 from Zhujiang College, South China agricultural university, 182 from Software engineering institute of Guangzhou, 213 from Guangzhou city Construction College, 154 from Guangzhou Nanyang polytechnic college, and 135 from Guangzhou Huaxia vocational college. The total number of administrative staff in the six private colleges and universities in Conghua region, Guangzhou City, China is 1041 (Interview Fang Zhuangkun, 2020, data collect on 5 December 2020). In this study, six private colleges and universities used quota sampling to design questionnaires.

At the same time, in order to improve the reliability and stability of the questionnaire, the researchers conducted a sample of 5 people from each of the six private universities, and a total of 30 people were pilot tested for the questionnaire. Immediately afterwards, the researchers again sampled 70 people from each of the six private universities, and issued a total of 420 formal questionnaires. The design of this questionnaire was all single-choice questions, mainly using Likert's five-level scale answer mode, and all questions on the scale were scored in a positive direction, and the score was from 5 to 1 as the basis for ensuring statistical analysis, The representative range of each score was 5=Strongly agree, 4=Agree, 3=Neutral, 2=Disagree, 1=Strongly disagree.

4.2 How to reliability analysis: George and Mallerx (2010) illustrated the value of Coefficient Cronbach's Alpha as the following: ≥ 0.9 =Excellent, ≥ 0.8 =Good, ≥ 0.7 =Acceptable, ≥ 0.6 = Questionable, ≥ 0.5 =Poor, and ≤ 0.5 =Unacceptable. Therefore, in order to make the research questionnaire to be reliable, its value of Coefficient Cronbach's Alpha must be at least 0.7. This data analysis consisted of a sample size of 420 participants. According to Cronbach's (2003) reliability analysis, the overall of Cronbach's Alpha coefficient was 0.945, indicating high internal reliability. In addition, the employee expectations factor was 0.859, caring motivation was 0.910, respect motivation was 0.842, trust motivation was 0.766, communication motivation was 0.781, tolerance motivation was 0.763, and praise motivation was 0.895, respectively. All the scale measurement in the questionnaire had an acceptable level of reliability (Hair et al., 2010).

4.3 How to collect data: 1) The primary data was obtained by online questionnaires or/and a self-administered questionnaire which distributed to the respondents who was an administrative staff in six private colleges and universities in Conghua District, Guangzhou city, China. According to the potential respondents, the appropriate sample size 420 responses were collected by quota sampling method. 2) The secondary data were obtained from relevant literature or research papers, such as textbooks, essays, independent research, and academic papers in order to complete this study.

4.4 Data Analysis: After collecting and sorting out the data, researchers examined, filtrated and encoded the whole data for further research. Firstly, the data analysis used the reliability analysis method, Cronbach's alpha to prove the consistency within the project. Secondly, the data analysis used the statistical analysis techniques of social science statistical computer software to analyze the frequency distribution, percentage, mean and standard deviation of the data. Finally, exploratory factor analysis (EFA) method were used to group the initial items in the data analysis, and the variables with high correlation were prepared together. It mainly carries out exploratory factor analysis on the detailed answers of observable variables by extracting principal components. The dimensions with different number of components were fitted and compared, and the rotation factor load is clearly explained.

5. RESEARCH RESULTS

Demographic information of the respondents: Regarding the basic information of the respondents, it was found that most of them were female (55.7%), Unmarried (61.0%), 30 years old or under (55.7%), Bachelor's degree or under (82.6%), 3 years or under (37.1%) in working years, earned an average monthly income of 4,001-6,000 Yuan (57.1%), and Administrative officer (67.1%).

Analysis of the element factors: Factor analysis was to assess the variability among observed, correlated variables, to analyze whether or not there were clear dimensions could be used to predict the covariates in regression. Orthogonal rotation was used to the principal component analysis. KMO values range from 0.00 to 1.00 and can be computed for the total correlation matrix as well as for each measured variable, values less than 0.50 were generally considered unacceptable (Hair et al., 2010). In determining the analysis results of the research variables, the Bartlett's spherical test was used to test the overall significance of the correlation between the variables ($p < 0.05$), and the Kaiser-Meyer-Olkin was used to examine the relationship between 37 variables. The results obtained by Bartlett's sphericity test for all variables were Chi-Square=19142.782, $df=666$, P-Value=.000 ($p < 0.05$), which showed that the variables in the data were significantly correlated. The result obtained by Kaiser-Meyer-Olkin (KMO) test for all variables was KMO=0.566, According to Vanichbuncha (2011) and Kaiser & Rice (1974), it was known that the data is suitable for factor analysis.

Table 1. Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	13.615	36.798	36.798	13.615	36.798	36.798	6.325	17.094	17.094
2	4.375	11.824	48.622	4.375	11.824	48.622	5.311	14.354	31.448
3	2.612	7.059	55.681	2.612	7.059	55.681	3.9	10.541	41.988
4	2.236	6.042	61.723	2.236	6.042	61.723	3.233	8.737	50.725
5	1.5	4.055	65.778	1.5	4.055	65.778	2.966	8.017	58.742
6	1.302	3.519	69.297	1.302	3.519	69.297	2.31	6.244	64.986
7	1.206	3.259	72.556	1.206	3.259	72.556	2.081	5.624	70.61
8	1.17	3.161	75.717	1.17	3.161	75.717	1.889	5.106	75.717
9	0.973	2.631	78.348						
...						
37	0.004	0.012	100						

From table 1 illuminates that use principal component analysis (PCA) and varimax orthogonal rotation technique to analyze the variables. The results show that there are 8 components with eigenvalues greater than 1, the eigenvalues of all elements range from 1.170 to 13.615, and the cumulative variance is 75.717%. There are Eigenvalues of 13.615, 4.375, 2.612, 2.236, 1.5, 1.302, 1.206 and 1.17. So, the result cannot be rejected, the factor extraction is eight and it accounts for 17.094%, 31.448%, 41.988%, 50.725%, 58.742%, 64.986%, 70.61% and 75.717% of the variances. Then, use the maximum factor load of each variable to determine whether it belongs to which component. In order to confirm the practical significance of the variable classification, the factor load must be greater than 0.60 (Hair et al., 2010). Following this standard, 13 variables were deleted. Only 24 variables remain. Factors analysis found that the element 1 (F1), Supervision factor is composed of 6 variables, and the factor load is between 0.646-0.816, and the variance explains 17.094% in the data. Element 2 (F2), Stimulation factor is composed of 5 variables, and the component weight is between 0.635- 0.847, and the variance explains 14.354% in the data. Element 3 (F3), Supposition factor is composed of 5 variables, and the component weight is between 0.650- 0.846, and the variance explains 10.541% in the data. Element 4 (F4), Survived factor is composed of 1 variable, and the component weight is 0.824, and the variance explains 8.737% in the data. Element 5 (F5), Sincere factor consists of 3 variables, with the component weight between 0.601- 0.698 and the variance explained 8.017 percent in the data. Element 6 (F6), Sureness factor consists of 2 variables, with the component weight between 0.703- 0.802 and the variance explained 6.244 percent in the data. Element 7 (F7), Sociable factor consists of 1 variable, with the component weight is 0.719 and the variance explained 5.624 percent in the data. Element 8 (F8), Significance factor consists of 1 variable, with the component weight 0.660 and the variance explained 5.106 percent in the data.

6. DISCUSSION AND CONCLUSION

According to the research of Bai Weihua (2019) and other scholars, emotional motivation are of great significance in the motivation methods of private colleges and universities. The managers of private colleges and universities can bring more respect and understanding to employees through various forms. Care and support, etc., employees can greatly improve their work efficiency when they are in an encouraging environment such as being respected, cared, understood and supported. Based on the analysis of the research results, the researchers explore the determinants of emotional motivation and the determinants of administrators' expectations in six private colleges and universities in Conghua District, Guangzhou City, Guangdong Province. Through exploratory factor analysis, they found that there are the following 8 Composition: (i) Supervision, (ii) Stimulation, (iii) Supposition, (iv) Survived, (v) Sincere, (vi) Sureness, (vii) Sociable, (viii) Significance. The element factors information as the follows:

(i) Supervision means that the executive leader care about employees' special days, work, or understand what is satisfied or dissatisfied with our work and do their best to improve. According to research conducted by Meng

Qinghua (2011), this kind of emotional and considerate motivation is an indispensable driving force to promote employees. In other words, considerate motivation is a method of real-time emotional motivation that warms people's hearts, has quick and great results.

(ii) Stimulation means that the executive leader will appropriately point out the mistakes of the employees in different ways, praise the work results of the employees, or praise them in the details. According to Wang Meinan's (2019) research survey, through fair, impartial and objective evaluations, evaluate individuals and deeds that have performed well or have shortcomings at work, and point out where they are excellent and where there are shortcomings. Comparison and analysis based on truth from facts encourage employees to change what they have. Encourage and continuously improve their abilities through mutual learning and help. In other words, it refers to maintaining or enhancing the self-motivatedness of employees and promoting work efficiency.

(iii) Supposition means that employees have their own preset standards for their own organizational environment, which are mainly reflected in the aspects of interpersonal relationship, self-realization, sense of belonging and identification, and respect. According to Xu Yiming's (2019), this expectation is mainly manifested in the aspects of stable work, a safe wage environment, friendliness, humane care, and fair welfare.

(iv) Survived mainly refers to the fact that the executive leader care about the lives of employees. According to Wan Hongmei's (2019) scholar's theory, leader help teachers solve difficulties encountered in life and resolve conflicts in life by caring about teachers' families.

(v) Sincere mainly refer to executive leader perceiving the needs of employees, giving them certain ways to improve, and often taking them to participate in important meetings or projects. According to the conclusion of Fang Bipeng (2015), such leaders' behavior provides a good development environment for employees' growth and talent.

(vi) Sureness means that the executive leader often put the names of employees on their lips, and can rest assured to entrust the arduous tasks to them. According to the research of Cao Yongding (2014), this kind of behavior of leaders is to encourage employees to do things that are conducive to their personal growth and the development of the company in any way on the basis of affirming their achievements.

(vii) Sociable means that employees have a preset friendly expectation of leaders, such as hoping that managers can give work instructions in a suggested tone. According to the literature by Liu Jiazhong (2018), this kind of expectation is in work arrangements, etc., which can arouse employees' enthusiasm for work, so that employees have a stronger sense of self-realization.

(viii) Significance means that leaders respect the old and love the young, and more importantly, respect their employees and put people first. According to Zhou Ronglong's (2020) theory, this refers to living in harmony with others in real life, treating others kindly, and being considerate of others.

A conceptual model of the factors that influence the emotional motivation of administrative staff in private universities; Conghua region, Guangzhou city, China which was called "8s model", was presented in a mind-map form as shown in Fig. 1

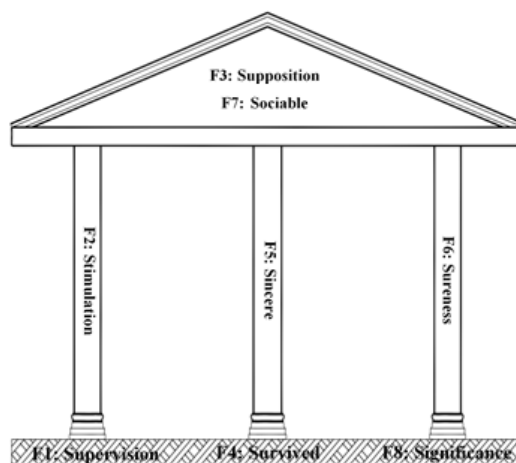


Fig. 1 Conceptual Model or 8s Model of emotional motivation of administrative staff in private universities; Conghua region, Guangzhou City, China

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Decision to Receive Acupuncture Treatment: Doctor-Patient Relationship as a Mediator Variable

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Abstract

In light of the pandemic, it is imperative to increase the utilization rate of acupuncture treatment among people; this study found that improving the relationship between doctors and patients is essential to cure diseases using traditional Chinese medicine medical resources. We analyzed 269 valid questionnaires to understand the public's influence on the medical knowledge, attitudes, and decision-making behavior related to acupuncture and moxibustion. The results of the study found that a good medical-patient relationship and acupuncture attitude completely mediate acupuncture medical knowledge and acupuncture decision-making. Among them, manufacturers, the military, the public and educational personnel, and middle-income people pay the most attention to the medical-patient relationship. In the medical-patient relationship, the privacy of patients and the participation of physicians in considering the disease information provided by patients are the most important. The attitude toward acupuncture and moxibustion among people in the service industry is the most positive. In the multi-medical environment, this study proposes that patient-centered medical-patient interaction is a key factor in acupuncture decision-making behavior, and it provides empirical data to prove the hypothesis.

Keywords: Acupuncture, Doctor-Patient Relationship, Intermediary Variables, Knowledge-Attitude-Practice Model.

1. INTRODUCTION

With the shortage of traditional Chinese medicine (TCM) medical resources due to external factors such as climate challenges and the current pandemic situation, acupuncture offers the advantages of convenience and quick effects. It is important to determine how to improve people's utilization of acupuncture treatment. In particular, the current mainstream medical treatment is patient-centered. Promoting good medical-patient interaction is an important key factor for curing diseases. Acupuncture treatment covers a variety of diseases. Pomeranz and Chiu's (1976) acupuncture pain relief mechanism initiated the research on the efficacy of acupuncture and moxibustion in the medical field. A review of the literature indicated that pain has always been a feature of acupuncture research over the past 20 years. It is the most common focus, followed by arthritis, tumors, mood disorders, stroke, vomiting, sleep, and paralysis (Ma et al., 2016). This study examines the relationship between knowledge and attitudes toward acupuncture and moxibustion and the choice of medical treatment.

2. Literature Review

This study uses the fourth model in Schwartz's (1975) knowledge, attitude, and practice (KAP) theory and the relationship between medical care and disease as a framework to explore the public's knowledge, attitudes, and medical behaviors toward acupuncture and their related factors.

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2.1. Knowledge, Attitude, and Practice Theory

Scholars at home and abroad have used the KAP model proposed by Schwartz (1975) in the field of health and medical care to explore the influence of knowledge and attitudes on medical behavior and related factors.

2.1.1. Knowledge

Dretske (1981) defined knowledge as the belief caused by information. Knowledge, attitude, and behavior can also be regarded as a whole. With correct knowledge, attitudes will be formed, and even decision-making behavior will be affected (Ben-Ari, 1996). Consumers' knowledge of products affects their purchase intentions (Bonfanti & Brunetti, 2015; Younus et al., 2015). Based on the above literature, we propose the following hypothesis:

Hypothesis H1-1: Acupuncture and moxibustion medical knowledge positively and significantly influences acupuncture decision-making practice.

Hypothesis H1-2: Acupuncture and moxibustion medical knowledge positively and significantly influences acupuncture and moxibustion medical attitude.

Hypothesis H1-3: Acupuncture and medical knowledge positively and significantly affects the relationship between doctors and patients.

2.1.2. Attitude

According to the theory of planned behavior (TPB), proposed by Ajzen (1991), attitude toward the behavior, subjective norm, and perceived behavioral control have significant positive effects on behavior intention. Thus, we propose:

Hypothesis H2: Acupuncture and moxibustion medical attitude positively and significantly influences acupuncture and moxibustion medical practice.

2.1.3. Practice

Behavior is defined as an individual's attempt to achieve a specific goal, which is governed by thoughts and manifested in all actions in daily life (Bergner, 2011; Rosenblueth et al., 1943). TPB points out that behavior intention is an indicator predicting the occurrence of behavior. Seeking medical behavior refers to the behavior of people seeking medical help after discovering symptoms. People seeking medical behavior will be affected by personal and external factors. Their medical decision-making mainly relies on information available from hospitals, which is affected by physician ability, personal economy, social psychology, and convenience. Therefore, we put forth the following hypothesis:

Hypothesis H4: Acupuncture medical attitude has an intermediary effect on acupuncture medical knowledge and acupuncture medical treatment practice.

2.2. Doctor–Patient Relationship

The doctor–patient relationship is the process by which doctors help patients reach a healthy state, including emphasizing medical–patient communication, patient participation in decision-making, and patient satisfaction (Turabian, 2018). A harmonious medical–patient relationship can affect the patient's treatment effectiveness and medical service quality (Ha & Longnecker, 2010). Research indicates that good medical–patient communication and interaction have a positive impact on the patient's satisfaction, and a good medical–patient relationship can increase the loyalty of patients to the physician and the medical institution to which they belong (Beck et al., 2002). Thus, we hypothesize:

Hypothesis H3: The relationship between the doctor and patient positively and significantly affects acupuncture and medical practice.

Hypothesis H5: The medical–patient relationship has an intermediary effect on acupuncture and moxibustion medical knowledge and acupuncture treatment practice.

2.3. Types and Efficacy of Acupuncture Treatment of Diseases

Acupuncture stimulates the acupoints on the body’s surface, thereby invigorating the blood and promoting qi to achieve the effect of curing diseases (Wang, 2019). Studies have shown that acupuncture can significantly lower blood pressure and reduce discomfort in patients (Çevik & İşeri, 2013, Longhurst & Tjen-A-Looi, 2013). Acupuncture can also improve immune function and control gastric acid secretion in patients with chronic atrophic gastritis (CAG; Xu et al., 2017). Acupuncture has a significant immunomodulatory effect and can reduce asthma (Wei et al., 2015). Thus, we propose the topic of acupuncture medical knowledge.

3. Methodology

This research uses the Patient–Doctor Relationship Questionnaire (PDRQ-9) to select suitable items in the medical–patient relationship dimension. The PDRQ-9 is used to measure patients’ psychological quality and effectiveness. It mainly follows a two-part structure; one part is related to the doctor, and the other part is related to the patient’s medical symptoms. Both parts show high reliability. The subjects of this research are mainly people from Taiwan. All people who live in Taiwan and are over 18 years old are included in the sample. The questionnaire was distributed to people over 18 years old in Taiwan between February 21 and March 8, 2021. All recipients received specific and detailed explanations. In the pre-test phase, 30 pre-test questionnaires were sent on February 18, 2020, and the questionnaire was returned to confirm its correctness. After testing the reliability and validity of the questionnaire and revising it as necessary, 280 formal questionnaires were issued. Eleven of the returned questionnaires were deleted due to invalid responses, leaving 269 valid questionnaires (the effective response rate was 96%). The correlation coefficient between the variables ranged between 0.310 and 0.686, indicating that there is no collinearity problem; this correlation coefficient indicated a moderate correlation.

3.1. Research Structure

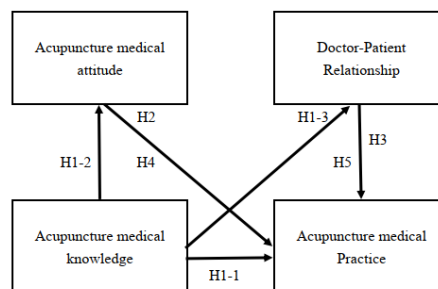


Figure 3.1 Research architecture diagram

3.2. Research Hypotheses

H1-1 Acupuncture and moxibustion medical knowledge positively and significantly influences acupuncture decision-making practice.

H1-2 Acupuncture and moxibustion medical knowledge positively and significantly influences acupuncture and moxibustion medical attitude.

H1-3 Acupuncture and medical knowledge positively and significantly affects the relationship between doctors and patients.

H2 Acupuncture and moxibustion medical attitude positively and significantly influences acupuncture and moxibustion medical practice.

H3 The relationship between the doctor and patient positively and significantly affects acupuncture and medical practice.

H4 Acupuncture medical attitude has an intermediary effect on acupuncture medical knowledge and acupuncture medical treatment practice.

H5 The medical–patient relationship has an intermediary effect on acupuncture and moxibustion medical knowledge and acupuncture treatment practice.

3.3. Questionnaire Design, Survey, and Analysis Methods

This research is divided into four research dimensions: acupuncture medical knowledge, acupuncture medical attitude, acupuncture medical behavior, and the medical–patient relationship. It uses a 7-point Likert scale as the measuring tool. Nominal ratios are used according to the personal background and characteristics of the interviewees, such as gender, age, marital status, occupation, education level, and average monthly income, as shown in Table 3-1. The KMO value of this questionnaire survey is 0.670 to 0.860, and Bartlett’s sphericity test is all 0.000. The Cronbach’s α coefficient value of the overall questionnaire is 0.898 while the Cronbach’s α coefficient value of the four dimensions ranges from 0.703 to 0.881. As shown in Table 3-1, the reliability and effectiveness of this study are evident.

Table 3-1 Validity / reliability

variable	KMO	Bartlett’s sphericity test /P-value	Cronbach’s α
Acupuncture medical knowledge	0.860	857.450 / 0.000	0.881
Acupuncture medical attitude	0.670	395.910 / 0.000	0.729
Acupuncture medical Practice	0.680	274.485 / 0.000	0.703
Doctor-Patient Relationship	0.761	447.077 / 0.000	0.803

Note. N=269

4. Methodology

Using descriptive statistics, we analyzed the data via a t-test and variability analysis. The study included 269 participants, with the majority (N=169; 62.8%) being female. Participants’ ages mainly ranged between 31 and 60 years, accounting for 79.2%. In terms of education, 144 people (53.5%) had a master’s degree or Ph.D., followed by 68 people (25%) in high school. In addition, 179 participants (66.5%) were married. Almost half (N=91, 47.9%) were employed in the service industry and financial insurance, while 64 (23.8%) were in the military, public education, or professional fields. Participants’ incomes were polarized: 71 people (26.4%) earned a monthly salary below NT\$30,000 while 55 people (20.4%) earned more than NT\$70,000.

4.1. Descriptive Statistical Analysis

Table 4.1. Public’s awareness of acupuncture medical knowledge/attitude/practice and doctor–patient relationship Doctor-Patient Relationship

Items		Strongly disagree	Disagree	Slightly disagree	Neutral	Slightly agree	Agree	Strongly agree
Acupuncture medical knowledge	K1	0(0.0%)	1(0.4%)	2(0.7%)	6(2.2%)	18(6.7%)	151(56.1%)	91(33.8%)
	K2	0(0.0%)	6(2.2%)	2(0.7%)	11(4.1%)	22(8.2%)	153(56.9%)	75(27.9%)
	K3	1(0.4%)	5(1.9%)	3(1.1%)	10(3.7%)	38(14.1%)	142(52.8%)	70(26%)
	K4	0(0.0%)	11(4.1%)	6(2.2%)	14(5.2%)	45(16.7%)	133(49.4%)	60(22.3%)
	K5	1(0.4%)	12(4.5%)	5(1.9%)	14(5.2%)	34(12.6%)	152(56.5%)	51(19%)
	K6	1(0.4%)	12(4.5%)	8(3%)	19(7.1%)	43(16%)	137(50.9%)	49(18.2%)
Acupuncture medical attitude	A1	3(1.1%)	9(3.3%)	3(1.1%)	5(1.9%)	38(14.1%)	131(48.7%)	80(29.7%)
	A2	1(0.4%)	10(3.7%)	4(1.5%)	17(6.3%)	37(13.8%)	138(51.3%)	62(23.0%)
	A3	0(0.0%)	1(0.4%)	0(0.0%)	4(1.5%)	9(3.3%)	96(35.7%)	159(59.1%)
	A4	0(0.0%)	1(0.4%)	0(0.0%)	2(0.7%)	12(4.5%)	114(42.4%)	140(52%)
	A5	0(0.0%)	7(2.6%)	7(2.6%)	8(3%)	41(15.2%)	135(50.2%)	73(27.1%)
Acupuncture medical Practice	P1	1(0.4%)	2(0.7%)	2(0.7%)	2(0.7%)	19(7.1%)	141(52.4%)	102(37.9%)
	P2	0(0.0%)	3(1.1%)	6(2.2%)	19(7.1%)	48(17.8%)	143(53.2%)	50(18.6%)
	P3	0(0.0%)	1(0.4%)	0(0.0%)	4(1.5%)	20(7.4%)	162(60.2%)	82(30.5%)
	P4	1(0.4%)	6(2.2%)	5(1.9%)	27(10%)	65(24.2%)	124(46.1%)	41(15.2%)

Doctor-Patient Relationship	P5	0(0.0%)	2(0.7%)	1(0.4%)	7(2.6%)	12(4.5%)	136(50.6%)	112(41.6%)
	R1	0(0.0%)	0(0.0%)	0(0.0%)	1(0.4%)	11(4.1%)	140(52%)	117(43.5%)
	R2	0(0.0%)	1(0.4%)	3(1.1%)	1(0.4%)	21(7.8%)	126(46.8%)	117(43.5%)
	R3	0(0.0%)	0(0.0%)	3(1.1%)	0(0.0%)	17(6.3%)	1225(45.4%)	127(47.2%)
	R4	0(0.0%)	0(0.0%)	1(0.4%)	5(1.9%)	28(10.4%)	152(56.5%)	83(30.9%)
	R5	0(0.0%)	0(0.0%)	0(0.0%)	7(2.6%)	35(13%)	158(58.7%)	69(25.7%)

Note. N=269

Table 4.2 Linguistic reference scale

Acronyms	Description of acronyms
K1	Acupuncture can treat neurological diseases.
K2	Acupuncture can treat bruises.
K3	Acupuncture can treat gynecological diseases.
K4	Acupuncture can treat metabolic diseases.
K5	Acupuncture can treat torhinolaryngology Department (ENT) diseases.
K6	Acupuncture can treat medical diseases
A1	When I have a disease that cannot be cured by Western medicine, I will seek acupuncture treatment.
A2	I would recommend acupuncture therapy to friends and relatives who are suffering from the disease.
A3	I think the doctor’s explanation to me before the acupuncture treatment is very important.
A4	I will follow the doctor's instructions after acupuncture and moxibustion (Notes).
A5	I can receive additional out-of-pocket expenses for acupuncture treatment.
P1	I will look for acupuncture and moxibustion doctors who often help me.
P2	I will look for well-known Chinese medicine practitioners for acupuncture.
P3	I will go to the traditional Chinese medicine hospital where I have been treated for acupuncture.
P4	I will go to the prestigious Chinese Medicine Hospital for acupuncture.
P5	I will go to a Chinese medicine hospital where the nursing staff has a very good attitude.
R1	I trust my doctor.
R2	I think that doctors will respect and accept the medical information provided by the patient as a reference for including diagnosis and treatment.
R3	The doctor will pay attention to the privacy of the patient and avoid making the patient feel uncomfortable.
R4	I think the doctor is helpful to my acupuncture treatment.
R5	I am satisfied with the results of the acupuncture treatment that the doctor has done for me.

Table 4.1 indicates the average values of the items related to acupuncture medical knowledge, attitudes, and practice as well as the doctor–patient relationship are 5.85, 6.09, 5.99, and 6.25, respectively, indicating that the public has a very positive understanding of acupuncture and moxibustion. Their awareness of medical knowledge is very high, but 3.4% to 7.9% of the interviewees did not agree that acupuncture can be used to treat gynecological, metabolic, otolaryngological, or internal diseases. Participants’ attitudes toward acupuncture and moxibustion treatment are highly positive: 98.9% indicated that they would follow the doctor’s advice to the greatest degree, with the doctor’s explanation before acupuncture treatment also being very important (98.1%). In the analysis of acupuncture and moxibustion treatment decision-making choices, 97.4% of the respondents would go back to a traditional Chinese medicine doctor for regular treatment, 98% would go to the medical institution where they were treated with acupuncture, and 96.7% would choose a Chinese medicine clinic with a very good attitude among nursing staff. The relationship between doctors and patients is also important as 99.6% of the interviewees believe doctors and 98.9% agree that doctors maintain patients’ privacy to avoid making them feel uncomfortable.

4.2. Multiple Regression Analysis

Table 4.3 Multi-factor line regression method

Dependent variable	Acupuncture medical Practice					
	Mode 1		Mode 2		Mode 3	
Independent variable	β value	t value	β value	t value	β value	t value
Acupuncture medical knowledge	0.310	5.335***	0.436	12.325***		
Acupuncture medical attitude						

Doctor-Patient Relationship			0.527	10.127**
R ²	0.096	0.190	0.278	
Adjusted R ²	0.093	0.187	0.275	
F value	28.467***	62.738***	102.556***	

*p≤0.05 is significant **P≤.01 ***P≤.001

As shown in Table 4.3, the independent variables are acupuncture and moxibustion medical knowledge, acupuncture and moxibustion medical attitudes, and the relationship between doctors and patients. The dependent variable acupuncture and moxibustion medical behaviors was regressed to obtain mode 1, mode 2, and mode 3. The adjusted R2 and F values are 0.093/28.467***, 0.187/62.738***, and 0.275/102.556***, respectively, while the β and t values are 0.310/5.335***, 0.436/12.325***, and 0.527/10.127***. As Table 4-3 indicates, the empirical data supported hypotheses H1-1, H2, and H3.

4.3. Mediation Model Test

The mediation effect means that the independent variable affects the dependent variable through the mediation variable. In this study, the BK test method of regression analysis was used for the mediation effect test (Baron & Kenny, 1986). Baron and Kenny identified three steps to verify the mediation effect: Assuming that X is the independent variable (IV), Y is the dependent variable (DV), and M is the mediation variable (IVV), use X to predict Y, use X to predict M, and use X to predict Y. X and M predict Y at the same time, and the model and regression equation are shown in Figure 4.1.

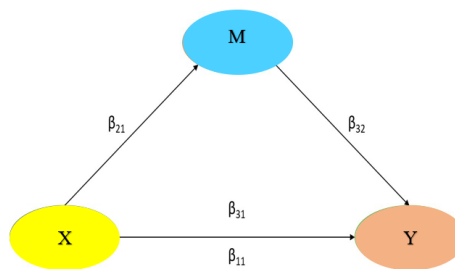


Figure 4.1 Mediation model

Model 1 $Y = \beta_{10} + \beta_{11}X + \epsilon_1 \dots \dots \dots (1) (X \rightarrow Y)$
 Model 2 $M = \beta_{20} + \beta_{21}X + \epsilon_2 \dots \dots \dots (2) (X \rightarrow M)$
 Model 3 $Y = \beta_{30} + \beta_{31}X + \beta_{32}M + \epsilon_3 \dots \dots \dots (3) (M \rightarrow Y)$

β₁₀, β₂₀, and β₃₀ are constants while β₁₁, β₂₁, and β₃₁ are regression coefficients. If the β₁₁ coefficient is determined to be significant, proceed to the second step. If the β₂₁ coefficient of the second step is significant, proceed to the third step. In the third step, X and M perform a stepwise regression analysis on Y. The tested β₃₁ coefficient must be significant, and the direct effect β₃₁ of X predicting Y must be less than the value of β₁₁ in Model 1 before it can be said to have a mediation effect. The fourth step is to detect the type of mediation effect. When M is added, if X’s predictive power on Y decreases and the direct effect of X predicting Y becomes insignificant and close to 0, then M has a complete mediation effect. If coefficients β₃₁ and β₃₂ reach significant levels and β₃₁<β₁₁, M has a partial mediating effect.

4.4. Regression Analysis with Acupuncture Medical Attitude as the Mediation

Using Baron and Kenny’s (1986) theoretical model, we followed a three-step method equation: $Y = \beta_{10} + \beta_{11}X + \epsilon_1$, $M = \beta_{20} + \beta_{21}X + \epsilon_2$, and $Y = \beta_{30} + \beta_{31}X + \beta_{32}M + \epsilon_3$. Table 4.4 shows that β₁₁=0.310 (P<0.001), β₂₁=0.686 (P<0.001), β₃₁=0.021 (P>0.05), and β₃₂=0.422 (P<0.001) are significantly different from zero, indicating that M has an intermediary effect. β₃₁=0.021 (P>0.05) is not significant, and β₃₁< β₁₁, with β₃₁’s value being approximately zero. Thus, M mediates the effect of X on Y—that is, the acupuncture medical attitude has a completely mediating effect. The data support hypothesis H4, as shown in Figure 4.2 and Table 4.4.

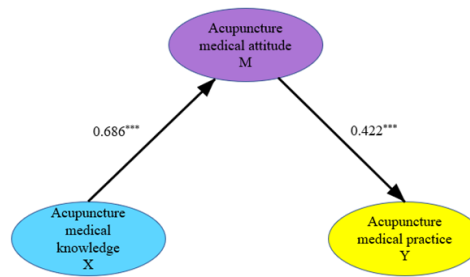


Figure 4.2 The path with acupuncture medical attitude as the mediation.

Table 4.4 Regression analysis with acupuncture medical attitude as the mediation.

Dependent variable	Acupuncture medical Practice		Acupuncture medical attitude		Acupuncture medical Practice	
	Mode 1		Mode 2		Mode 3	
Independent variable	β value	t value	β value	t value	β value	t value
Acupuncture medical knowledge	0.310	5.335***	0.686	15.398***	.021	0.280
Acupuncture medical attitude					0.422	5.562***
R ²	0.096		0.470		0.191	
Adjusted R ²	0.093		0.467		0.184	
F value	28.467***		237.086***		31.300***	
Collinearity	Tolerance				0.530	
	VIF				1.888	

*p ≤ 0.05 is significant **P ≤ .01 ***P ≤ .001

Mode 3 Acupuncture medical knowledge t value is 0.280, significant is 0.780.

4.5. Regression Analysis with Doctor–Patient Relationship as the Mediation

Using Baron and Kenny’s (1986) theoretical model, we developed a three-step method equation: $Y = \beta_{10} + \beta_{11}X + \epsilon_1$, $M = \beta_{20} + \beta_{21}X + \epsilon_2$, and $Y = \beta_{30} + \beta_{31}X + \beta_{32}M + \epsilon_3$. Table 4.5 shows that $\beta_{11} = 0.310$ ($P < 0.001$), $\beta_{21} = 0.414$ ($P < 0.001$), $\beta_{31} = 0.112$ ($P > 0.05$), and $\beta_{32} = 0.481$ ($P < 0.001$) are significantly different from zero, demonstrating that M has an intermediary effect. In addition, $\beta_{31} < \beta_{11}$, and the value of β_{31} is approximately zero, which means that M mediates the effect of X on Y. Thus, the relationship between the doctor and the patient has a complete mediating effect, supporting hypothesis H5, as shown in Figure 4.3 and Table 4.5.

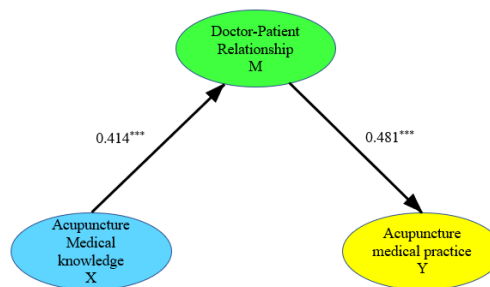


Figure 4.3 The path with doctor–patient relationship as the mediation.

Table 4.5 Regression analysis with doctor–patient relationship as the mediation.

Dependent variable	Acupuncture medical Practice		Doctor-Patient Relationship		Acupuncture medical Practice	
	Mode 1		Mode 2		Mode 3	
Independent variable	β value	t value	β value	t value	β value	t value
Acupuncture medical knowledge	0.310	5.335***	0.414	7.421***	0.112	1.965

Doctor-Patient Relationship			0.481	8.457***
R ²	0.096	0.171	0.288	
Adjusted R ²	0.093	0.168	0.282	
F value	28.467***	55.075***	53.757***	
Collinearity	Tolerance		0.829	
	VIF		1.206	

*p ≤ 0.05 is significant **P ≤ .01 ***P ≤ .001

Mode 3 Acupuncture medical knowledge t value is 1.965, significant is 0.051

4.6. Hypothesis Verification

Table 4.6 Hypothesis verification

Hypothesis	Judge	Refer
H1-1 Acupuncture and moxibustion medical knowledge positively and significantly influences acupuncture decision-making practice.	established	Table 4.3
H1-2 Acupuncture and moxibustion medical knowledge positively and significantly influences acupuncture and moxibustion medical attitude.	established	Table 4.4
H1-3 Acupuncture and medical knowledge positively and significantly affects the relationship between doctors and patients.	established	Table 4.5
H2 Acupuncture and moxibustion medical attitude positively and significantly influences acupuncture and moxibustion medical practice.	established	Table 4.3
H3 The relationship between the doctor and patient positively and significantly affects acupuncture and medical practice.	established	Table 4.3
H4 Acupuncture medical attitude has an intermediary effect on acupuncture medical knowledge and acupuncture medical treatment practice.	Fully established	Table 4.4
H5 The medical-patient relationship has an intermediary effect on acupuncture and moxibustion medical knowledge and acupuncture treatment practice.	Fully established	Table 4.5

5. Conclusion

5.1. Findings

This study found that the public is most concerned about the relationship between doctors and patients, especially the right to privacy and doctors' acceptance of information or data provided by patients. In addition, acupuncture medical attitudes and the relationship between doctors and patients completely mediate knowledge of acupuncture and moxibustion. Regarding the decision-making behavior related to acupuncture and moxibustion, there is only a partial intermediary effect from previous studies. These results differed from those of Ho (2019). People's knowledge of acupuncture and moxibustion affects their decision-making behavior related to acupuncture through a positive attitude or a good medical relationship. Knowledge gained through a positive attitude toward acupuncture and moxibustion can increase patients' willingness to seek medical treatment. In addition, their willingness to seek medical treatment can increase due to good medical communication. The people are loyal to the factors involved when choosing medical treatment, and the main choice to return to a clinic is based on the medical institution and the doctor, which have a decisive influence on whether the attitude of medical care is good.

5.2. Future Research

The relationship between medical professionals and patients is becoming increasingly important, and it is necessary to construct a standard scale for acupuncture and medical relationship.

5.3. Limitations

The questionnaire used did not cover all variables

5.4. Research Contributions

This research makes academic contributions to research on traditional Chinese medicine related to acupuncture and moxibustion. It can also provide research data to traditional Chinese medicine clinics to grasp a good medical relationship and accelerate the treatment of patients' diseases to reduce social medical costs.

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Impact of Personnel Costs in Savings Banks

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Abstract

Earnings of regional credit institutions have been declining for several years. Subsequently, the German savings banks as regional banks must explore new earnings potential and, at the same time reduce costs. The assumption of managers that customers are increasingly using digital access paths is leading to a significant reduction in the number of employees in banks. Digitalisation allows services to be processed more efficiently. However, it seems that measures taken in the local banking market to reduce labour costs are partly based on managers' instinct because necessity of cost reduction is often mentioned at management events in practice.

While some Experts suggest managers to improve their results by investing in sales staff, others are moving towards consistent cost management and staff reductions. The question arises which of the paths is the more effective. Investment for additional profit or cost reduction.

Keywords: Financial Institution, Financial Service, Development Bank

1. INTRODUCTION

Three sectors exist in the German banking market. Credit institutions have recovered from the banking crisis of 2008, but they are also struggling with the issues of digitalisation and the associated technical progress as well as increasing competition, the increasing regulatory burden and low interest rates. ("Aktuelle Herausforderungen für den deutschen Bankensektor", n.d.).

As a result of the fact that mergers and the reduction of the branch network are partly considered success factors, there was a reduction in the total number of banks in Germany (from 2,301 institutions in 2006 to 1,888 in 2016) and a reduction of bank branches (from 46,444 in 2005 to 36,005 in 2015). (Bankenverband, n.d.). The number of Savings banks and cooperative banks is declining significantly. Nevertheless, these form the two main pillars of the German banking system. However, the mergers are clearly noticeable in both groups of institutions (in the last 20 years the number of about 600 Savings banks has fallen to 400 and of 2,600 cooperative banks to 900). (Bankenverband, n.d.).

When looking at the earnings situation of German banks, it becomes clear that Savings banks and credit unions in particular, have a strong dependence on net interest income. More than 76% of the operating result depends on the net

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interest income, which makes it a key success factor. At the major banks, this share is much lower, at 62%. Apart from the fact that the existing equity capital is only very low interest rates, the interest margin has reduced significantly. (Deutsche Bundesbank, 2017, p. 4).

Analyzing banks in Germany as a whole, shows a constant operating income over the past 10 years. Apart from the banking crisis in 2008, both the operating result before and after valuation, are consistently neat. Since 2013, the ECB's zero interest rate policy has been reflected, with both results slightly reduced but consistent since then. (Deutsche Bundesbank, 2017, p. 12).

The total yield pool of the banks in Germany in the years 2013 - 2016 was stable at 115 billion EUR, of which 60% are for private and business customers, about 25% for larger corporate customers and the rest for other business fields. However, the earnings situation of the individual German banks is not particularly strong, especially in international comparison. For example, the return on equity after tax in 2016 was only 1%, compared with, for example, 9% in the US and 6.5% in France. ("OliverWyman_GermanBankingReport_2018.pdf", n.d.).

Experts and bank managers are pursuing different strategies to meet the challenges of the future. While some want to improve their results by investing, among other things, in sales staff, others are moving towards consistent cost management and staff reductions.

2. Actuality of the topic

In the future, the emergence of a fourth pillar in the German banking market is to be expected. This is not an additional support to stabilise the banking system, but an a new rival within the future banking system. In addition to a variety of FinTechs (e.g., GINI Photo Transfer), foreign banks (e.g., ING DIBA), and infrastructure providers (e.g., Thomson Reuters), international technology companies with their platforms (e.g., Google, PayPal, Amazon, Facebook) will at least play a role. The expected modularisation of financial services will be given a high relevance. ("OliverWyman_GermanBankingReport_2018.pdf", n.d.). This could be underlined by the fact that the online banking usage rate in Germany continues to increase. A survey of the banking association in June 2018 showed a usage rate of 50% (in 2000 = 11%, in 2008 = 36%). (Bankenverband, n.d.).

The Savings Bank Finance Group has remained Germany's biggest banking group and one of the biggest banking groups in the world. It is structured in a decentralised way and Savings Banks are available all over Germany. A total of 1,200 billion total assets are distributed among nearly 400 regional institutes, which employ a total of 216,000 people and are represented throughout Germany, with more than 13,000 branches. (DSGV, n.d.).

As the market leader in the German private client and medium-sized lending business, 50 million customers maintain a relationship to the Savings Bank. (DSGV, n.d.). Being credit institutions under public law, there is no municipality in Germany without a Savings Bank. The institutions of the Savings Banks Finance Group is one of the biggest commercial employers and one of the biggest taxpayers, training leader in the financial sector and the biggest non-governmental sponsor of sports and cultural events in Germany. New loan commitments made by Savings Banks to enterprises and self-employed people, amounted to EUR 83,7 billion in 2017. ("DSGV_FB-2017_Online_EN.pdf", n.d.). Around 450 million euros were spent by the Savings Banks Group in 2017 for donations, sponsorship and special-purpose income, and around EUR 3.3 billion in taxes were paid. (Giroverband, n.d.). In addition to the networking of employees in the region, customers should also benefit from networks. By way of example, advantages and cashback offers of value-added accounts, which are used by many bank customers, may be mentioned here. The advantage of this are that local retailers will benefit from "advertising" by the local bank and the bank's customers will profit. (Giroverband, n.d.).

Looking at the results of the savings banks, with a slight increase in administrative expenses, a good constant operating result before and after valuation is around EUR 10 billion p.a. (Deutsche Bundesbank, 2017, p. 13). The consolidation trend in the industry is not only followed by many savings banks, but also by the economic problems of some Landesbanken. Furthermore, there is a central company that provides IT for the German savings banks and one that provides the rating systems, which shows that the market leader's approach is based on the centralization of bundled processes. ("OliverWyman_GermanBankingReport_2018.pdf", n.d., p. 10). It can be assumed that local savings banks will not be able to provide the required expertise in this area, any more than they will be able to partially represent a favorable "production" for lack of economies of scale. For the savings banks with their close customer interface, it would therefore be a sensible strategy to become an indispensable part of a region. IT connections must be used to present comprehensive solutions to customers. ("OliverWyman_GermanBankingReport_2018.pdf", n.d., pp. 16–19).

The future strategy of Savings Banks is to continue the emphasis on common welfare, regionality and thus "reliability and proximity" to the customers. In addition, the digitisation trend is taken into account, by focusing a Germany-wide strategy upon it. Digitisation issues are very important for budget distribution, whereby the bank

comparison shows that it is well positioned. As part of the digitisation strategy, many standardisable business processes will be transferred to the online channel. Here, the Savings Bank follows the user behavior. Issues such as online self-help tools and contract conclusion opportunities are pushed. There are a lot of regulatory issues for the future, but also, exactly such future strategies on the agenda. For example, topics that deal with the private and corporate client business. The goal is to provide in the small-scale standard business with digital access. In particular, as the costs per business transaction often exceed the returns. However, a more intensive consultation should still be available in the branches. In addition, the Savings Banks Group has undertaken the topics of "personnel costs comparison" and "process automation in operation", (in particular end-to-end analysis and efficient processing) for further development. The topics are rounded off by the current account and payment strategy.

In the organisation, one deals intensively with future topics. Examples for this are the multi-channel access routes e-mailbox, advisor app and video consulting.

In addition to the focus on efficiency, the current business strategy of the organisation focuses on the heading "increasing customer satisfaction" and sets this with a concrete target. A further project is to improve this potential in commercial customer clientele by offering more holistic services (e-commerce, card payment methods, e.g.). It is questionable in how far the target direction "permanent contact person, the comprehensive advice and high-quality products" is up-to-date for customers and financially sustainable for the bank in the medium term. Current trends in savings banks also show that the flow of customers should be partially directed. The savings banks see themselves as the most important financial partner of the private clientele and the middle class. Based on the 200-year history, today Savings Banks are very different from companies created for the sole purpose of profit. („Der Kunde im Mittelpunkt – die Strategie der Sparkassen-Finanzgruppe“, n.d.). Surveys underline that Savings Banks and cooperative banks may benefit from their respective branch structure. In 2017, over 80% of respondents to a survey by the Bankers Association said that they did not believe that banks need branches any longer. Furthermore, 95% of the respondents said that they did not want to transfer their finances to providers like Google or Amazon. Over 80% of customers also say that they are satisfied or very satisfied. The German banking market can look forward to solid earnings potential. When comparing the groups of institutions, it should be noted that the specialized institutes, cooperative banks and Savings Banks in particular have a good cost-income ratio. Thus, these banks have a positive impact on the overall cost-income-ratio of 69.2% (EUR 0.69 expense for EUR 1 income). Big banks, on the other hand, show a significantly rising ratio (in 2016 this was over 85%).(Deutsche Bundesbank, 2017, p. 18).

However, a valid future forecast is difficult. Financial experts predict death of banks from 1900 to 150-300 institutions in the next 10-15 years, thus indicating the process of consolidation. Nevertheless, it remains to be seen whether this prediction will come true, as the German banking market is untypical. Morning Stanley notes in a study that, for example, in Belgium and the Netherlands over 80% of the market is made up of the five largest French banks, whereas in Germany the three largest listed institutions Deutsche Bank, Commerzbank and Hypo Vereinsbank (Unicredit) make up only 15% of the market share.(Frühauf, n.d.).

Especially against the background of the stronger competition described above, but also against the background of the expert recommendations, it seems advisable to deal intensively with the topic of cost reduction if one wants to belong to the surviving banks.

In the following, as a theoretical basis, it is examined when and how positive profit contributions were achieved in companies in the past. This connects the past of many companies and research results with the current solutions that experts and managers are currently pursuing in banks - cost reductions.

3. Theoretical Background

3.1. Industrialisation

In contrast to the banks, many industries were already characterised by industrialisation more than 200 years ago. After the steam engine was invented in England at the end of the 18th century, machines replaced the work of many people in Germany in the 19th century. A brief socio-cultural look at the background of industrialisation underlines that historical changes, social change and technological progress can be identified as characteristics. One cause is population growth, and development often goes hand in hand with the expansion of trade and the accumulation of capital. Both are favoured by technological innovations. In today's industrial society, the key concepts are urbanisation, increasing division of labour, economic dependence, globalisation and climate change (Buchheim, 1994).

Even though many sectors are now industrial, many a cooperative bank or savings bank still produces its loans in the style of a manufactory in the 21st century. However, more and more institutions are moving towards uniform solutions - at least those that want to actively shape their future. The number of centrally available processes is also

increasing. A central receivables management for non-performing loans or data protection officers operating throughout Germany are exemplary options.

For progressive institutions, bundling services and processing them mechanically is a successful model. Even if a bank is locally rooted, economies of scale can be exploited.

From a microeconomic perspective, technical innovations are exorbitant, especially in today's digitalised times. They can offer great opportunities for local banks: Online offerings and online purchase processes without media discontinuity are possible, as are robo-advising and other digital services. At the same time, they face a transparent price-sensitive market. Customer-friendly, simple processes are therefore all the more necessary.

3.2. Standardisation and automation

In addition to increasing earnings, which many institutions are striving for, reducing personnel costs is an essential lever for successful development. Theory and practice show here that the key lies in efficient production. In the cooperative sector, the term "production bank" is well established, whereas the savings banks in the lending sector have yet to grasp this idea in part and the production idea is not immediately apparent from the term "back office". In terms of content, however, similar work takes place in both groups of institutions.

However, one looks in vain for real standards and automated processes. For the sake of understanding, both terms will be explained here:

Standardisation on the one hand includes the standardisation of parts and processes. A combination of individual parts into production elements and individual workflows into uniform processes leads to a reduction in production time and costs. It also facilitates cooperation across departmental and company boundaries. At the same time, it contributes to improving quality standards and control mechanisms (Hartlieb/ Kiel/ Müller, 2009, p. 9).

Automation implies a move away from manual production towards machine production. Increasingly complex work processes require the bundling of resources and capacities for processing or storing information (Spur, 1994, p. 11-12).

There are numerous examples of standard or automated solutions not being implemented in institutions. The automatic calculation of credit lines (e.g. asset line in the S-finance group) is still only used by some of the institutions, although it can be implemented within a few weeks without any problems. The automatic adjustment of overdraft facilities is also hardly widespread.

However, the opportunities of digitalisation give exactly these options and access to customers is easy for both groups of institutions because of their market position. In practice, however, one often hears why "everything is difficult", "special", a "feature" or "doesn't work".

One might assume that the future would be more positive if this argumentative energy were spent on solutions. But if you listen to some of the talk, economies of scale are no more aspired to than the standards and automatic processes mentioned above. In practice, "the future is simple" or "getting started is easy" is not heard as often as advertised.

However, some institutes show that it can be done. Accordingly, it seems reasonable to assume that cross-institutional cooperation and determination on the one hand and success on the other correlate positively.

3.3. Cooperation

The success of cooperation is shown, for example, by institutes that continuously exchange information with each other. Interestingly, successful people talk to each other about solutions. With increasing popularity, successful cooperation also means going beyond one's own supposedly better solution and using that of another. In the context of the aspects mentioned, the concepts of economies of scope and economies of scale should be briefly explained:

Economies of scope result from the joint use of existing resources by several production units with the aim of manufacturing different products. The standardisation and modularisation of products leads to lower prices due to the use of input factors in correspondingly higher quantities (Pausenberger, 1993, p. 4442).

Economies of scale describe the classic scale effect, i.e. the decrease in unit costs with increasing production quantities. Automation and standardisation usually require enormous investments, i.e. they go hand in hand with high fixed costs. The production of high unit quantities consequently leads to falling fixed costs per unit (Helm, 1997, p. 828).

Both effects can be used in both groups of institutions mentioned. Although some people within the bank claim that the central solution is worse than their own, they often forget that the "one process in Germany" is usually much

cheaper than the one customised for the individual institution. But there are many fans for the local expensive process solution. And the desire for individuality is more pronounced than that for standard and cost savings.

However, these proponents ignore the scientific findings and the proven advantages of economies of scale as well as the other theoretical principles described above. In order to verify whether it can be deduced that reduced costs, which in the savings bank sector are largely personnel costs, it is analysed to what extent savings banks with lower personnel costs achieve better operating results.

4. Key figures for measuring the success of savings banks and effects of personnel cost reduction

Various research projects have dealt with success factors. In success factor research, earnings, growth and independence were highlighted as descriptive variables for success. In this paper, the factor "earning" is selected as the descriptive variable for success, as earnings are consistently seen as valid for measuring success factors in several research projects in the banking sector. Experts agree that the operating result is a good indicator. Furthermore, the cost-income ratio (CIR) could be an indicator. (Maurer, 2016, p. 7; Richter et al., 2018) A CIR of 70% therefore means that costs of EUR 70 will be required for EUR 100 income.

In the following, savings banks were evaluated and the influence of the reduction in personnel costs on the variables Earnings. For this paper, the data from 450 annual financial statements of Lower Saxony savings banks for the years 2006 to 2016 were used. In Germany, these are published on the websites of the relevant banks and in the electronic Federal Official Gazette. ("Bundesanzeiger", n.d.). The data was set in relation to the balance sheet total in order to ensure comparability of the values.

5. Quantitative data analysis of the cause of personnel expenditure on the effect operating result

The univariate regression with operating result as a dependent variable and personnel expenses as an independent variable (influencing factor) shows a corrected R2 of 0.1120 at 0.000 Sig. in the ANOVA F-Test. Accordingly, the explanatory contribution of personnel expenses to the operating result is 11.2 percent. The stated variance thus accounts for 11.2 percent of the total variance. The significance of <0.05 proves a high significance, which means that the result is secured against coincidences. With regard to the correlation, there is a correlation of -0.3370, which can be described as a mean correlation.

The non-standardised coefficient is also analysed, which states that an operating result of EUR 100 can be achieved by reducing personnel expenses by EUR 48.3.

Model	R	R-Squares	Adjusted R-Squares	Std. Error of the Estimate
1	,337 ^a	,114	,112	,22367

		Regr. Coefficient	Coefficients Error	Beta		
1	(Const.)	1,574	,081		19,439	,000
	Pers.Costs	-,483	,064	-,337	-7,587	,000

Even if, in contrast to regression, the correlation shows no cause-and-effect relationships, it can at least be stated that savings banks generate more income with less personnel expenditure.

		Pers. Costs Op. Result	
Pers.Costs	Pearson- Correlation	1	- ,337**
	Signifikance (2-seitig)		,000
	N	451	451
Op. Result	Pearson- Correlation	- ,337**	1
	Signifikance (2-seitig)	,000	
	N	451	451

An additional multiple regression analysis was carried out to assess the weighting of the influence of personnel expenses in relation to the key earnings-describing measures of net interest income and commission income for savings banks and the other key expense measure of general administrative expenses. How is the operating result as a dependent variable influenced by net interest income, commission income, personnel expenses and other operating expenses as independent variables? It becomes clear that these variables account for almost 100% of the operating result. The multiple regression with CIR as dependent variable and personnel expenses as independent variable (influencing factor) shows a corrected R² of 0.989 at 0.000 Sig. in the F-test of ANOVA.

Since the standardized coefficients must be analyzed when assessing proportionality, they are taken from the result of multiple regression analysis. The result shows that net interest income has the most significant leverage on the operating result. At +97.3%, this value has a strong positive influence. The second most important place, if the weights are analysed by amount (because expenditure has a positive effect on earnings in minus), is personnel expenditure. This has an effect of -69.8%. Commission income and operating expenses have a significantly lower effect.

Model	R	R- Squares	Adjusted R-Squares	Std. Error of the Estimate
1	,995 ^a	,989	,989	,02445

		Unstandardised Reg. Coeffic.	Unstandardised Coefficients Error	Stand. Coefficients ^t	t	Sig.
1	(Const.)	,013	,015		,916	,360
	Pers.Costs	-1,000	,009	-,698	- 108,815	,000
	Net interest income	,987	,005	,973	185,802	,000
	Commission income	1,062	,019	,361	55,287	,000
	Operating expenses	-1,013	,015	-,393	-68,539	,000

6. Conclusions

On the basis of the declining earnings situation, many banks are acting with personnel cost reductions as a supposed success factor. The main object of investigation is regression, which is based on the savings bank's earnings, i.e. its operating result, on the one hand, and on the cost-income ratio, which is the key performance indicator, on the other.

The results are summarised as follows:

- The banking landscape is undergoing a major upheaval. Local institutions such as the savings banks are strongly affected by this.
- The savings banks as service providers benefit if they reduce personnel expenses.

- The thesis that a reduction in personnel expenses has a positive effect on the operating result is confirmed. The univariate regression shows 11.2%. This figure is not marginal. There is an average correlation of 33.7% between operating profit and personnel expenses.
- Compared to the significant items in the Savings Bank's income statement, net interest income and personnel expenses have the greatest impact on the operating result.
- Compared with the significant items in the Savings Bank's income statement, personnel expenses have the greatest impact on the cost-income ratio.

The hypothesis that a reduction in personnel expenses has an impact on the Savings Bank's earnings position is therefore confirmed in all aspects.

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Fuzzy MCDM Procedure for the Evaluation of Transportation Service Providers

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Abstract

Sustainable transportation has also an important role in supply chain and logistics management. It constructs the basis of sustainable supply chain management. Identifying the most appropriate transportation service provider requires considering multiple conflicting criteria that are organized in a hierarchical structure. In this research, a hierarchical fuzzy multi-criteria decision making procedure is used in order to evaluate transportation service providers.

Keywords: Fuzzy Sets, Multi-criteria Decision Making, Transportation service provider.

1. Introduction

Transportation has an important role in supply chain and logistics management. Supply chain management (SCM) can be seen as a strategic partnership between retailers and suppliers. SCM connects firms to their suppliers, manufacturers, retailers, and customers. The effective management of supply chains has a positive impact on the overall performance of the organizations. To transfer goods and materials, firms usually outsource transportation services. Sustainability is one of the key aspects in selecting the most suitable transportation service provider, which requires to consider multiple criteria. Sustainable transportation is also the basis of sustainable SCM [1].

This paper employs hierarchical fuzzy multi-criteria decision making (MCDM) methodology for the evaluation of transportation service providers. The methodology considers the conflicting evaluation criteria under fuzzy environment, which are yielded in a hierarchy. Moreover, it ranks the alternatives by considering both the distances to ideal and anti-ideal solutions. Furthermore, in the literature, the number of studies that handle the sustainable transportation evaluation problem are not sufficient. This paper fills the gap on the subject. The rest of the study is organized as follows. In Section 2, the employed hierarchical fuzzy MCDM approach is delineated. The case study is illustrated in Section 3. Conclusions are given in the final section.

2. Hierarchical Fuzzy MCDM Approach

This paper uses the hierarchical distance-based fuzzy MCDM algorithm developed by Karsak and Ahiska [2] for determining the most suitable sustainable transportation service provider. The methodology is explained as follows:

Step 1. Organize a committee of experts and describe the alternatives and evaluation criteria.

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Step 2. Form the decision matrix that gives the importance weights of criteria and sub-criteria, and the ratings of alternatives.

Step 3. Normalize the evaluation matrix as

$$y_{ijk} = \begin{cases} \frac{y_{ijk} - y_{jk}^-}{y_{jk}^* - y_{jk}^-}, & k \in CB_j; i = 1, 2, \dots, m; j = 1, 2, \dots, n \\ \frac{y_{jk}^* - y_{ijk}}{y_{jk}^* - y_{jk}^-}, & k \in CC_j; i = 1, 2, \dots, m; j = 1, 2, \dots, n \end{cases} \quad (1)$$

where y'_{ijk} gives the normalized value of y_{ijk} , which is the rating of alternative i via the sub-criterion k of criterion j , m is the number of alternatives, n is the number of criteria, CB_j is the set of benefit-related criteria and CC_j is the set of cost-related criteria.

Step 4. Aggregate the ratings of alternatives at the sub-criteria level to criteria level via the following equation

$$\tilde{x}_{ij} = (x_{aij}, x_{bij}, x_{cij}) = \frac{\sum_k \tilde{w}_{jk}^1 \otimes \tilde{y}_{ijk}}{\sum_k \tilde{w}_{jk}^1}, \quad i, j \quad (2)$$

where \tilde{x}_{ij} is the aggregate rating of alternative i with respect to criterion j , \tilde{w}_{jk}^1 indicates the average importance weight assigned to sub-criterion k of criterion j .

Step 5. Normalize the aggregate ratings as follows:

$$\tilde{r}_{ij} = (r_{aij}, r_{bij}, r_{cij}) = \left(\frac{x_{aij} - x_{aj}^-}{x_{cj}^* - x_{aj}^-}, \frac{x_{bij} - x_{aj}^-}{x_{cj}^* - x_{aj}^-}, \frac{x_{cij} - x_{aj}^-}{x_{cj}^* - x_{aj}^-} \right), \quad i, j \quad (3)$$

Step 6. Determine the ideal solution $A^* = (r_1^*, r_2^*, \dots, r_n^*)$ and the anti-ideal solution $A^- = (r_1^-, r_2^-, \dots, r_n^-)$, where $r_j^* = (1, 1, 1)$ and $r_j^- = (0, 0, 0)$ for $j = 1, 2, \dots, n$.

Step 7. Compute the weighted distances from ideal solution and anti-ideal solution (D_i^* and D_i^- , respectively) for each alternative as

$$D_i^* = \sum_j 1/2 \{ \max(w_{aj}^1 |r_{aij} - 1|, w_{cj}^1 |r_{cij} - 1|) + w_{bj}^1 |r_{bij} - 1| \}, \quad i = 1, 2, \dots, m \quad (4)$$

$$D_i^- = \sum_j 1/2 \{ \max(w_{aj}^1 |r_{aij} - 0|, w_{cj}^1 |r_{cij} - 0|) + w_{bj}^1 |r_{bij} - 0| \}, \quad i = 1, 2, \dots, m \quad (5)$$

Step 8. Compute the proximity of the alternatives to the ideal solution, P_i^* , as

$$P_i^* = \frac{D_i^-}{(D_i^* + D_i^-)}, \quad i = 1, 2, \dots, m. \quad (6)$$

Step 9. Rank the alternatives according to P_i^* values in descending order.

3. Case Study

The case study is performed in a dye manufacturer in Turkey. Hierarchical fuzzy MCDM method is adopted for transportation service provider selection problem for the related case. The firm has 6 potential transportation service provider. First, evaluation criteria are determined by reviewing the literature as in Table 1.

Table 1. Evaluation criteria [5].

Criteria
Economic Issues (C ₁)
Cost performance (C ₁₁)
Financial performance (C ₁₂)
Experience (C ₁₃)
Market share (C ₁₄)
Environmental Issues (C ₂)
Green technology utilization (C ₂₁)
Environment awareness (C ₂₂)
Recycling policy (C ₂₃)
Environmental legal and policy framework (C ₂₄)
Energy-efficient transportation utilization (C ₂₅)
Social Issues (C ₃)
Relationships with clients (C ₃₁)
Ease of communication (C ₃₂)
Labor relations (C ₃₃)
Ethical awareness (C ₃₄)
Health and safety (C ₃₅)
Employee welfare (C ₃₆)
Human rights (C ₃₇)
Operational Issues (C ₄)
Service quality (C ₄₁)
Location (C ₄₂)
Reputation (C ₄₃)
Responsiveness (C ₄₄)
Optimization capability (C ₄₅)
Delivery (C ₄₆)
Information technology utilization (C ₄₇)
Risk management policy (C ₄₈)
Information sharing (C ₄₉)
Capacity (C ₄₁₀)
Flexibility (C ₄₁₁)

The evaluation is performed by four experts and they give their opinions by constructing a consensus utilizing the fuzzy linguistic scale given in Table 2.

Table 2. Linguistic scale.

Linguistic term	Fuzzy number
VH	(0, 0, 0.25)
H	(0, 0.25, 0.50)
M	(0.25, 0.50, 0.75)
L	(0.50, 0.75, 1)
VL	(0.75, 1, 1)

The evaluations are given in Table 3.

Table 3. Evaluation of the alternatives and criteria.

Criteria	Weights of criteria	A ₁	A ₂	A ₃	A ₄	A ₅	A ₆
C ₁	H						
C ₁₁	H	M	H	L	VH	L	M
C ₁₂	M	M	VH	VL	H	M	L
C ₁₃	VH	H	M	M	H	H	M
C ₁₄	M	M	H	M	M	H	H
C ₂	VH						
C ₂₁	H	L	M	M	M	H	M
C ₂₂	H	L	L	M	L	M	H
C ₂₃	H	M	M	L	M	M	M
C ₂₄	M	M	L	L	M	H	L
C ₂₅	VH	L	VL	VL	L	L	VL
C ₃	H						
C ₃₁	M	H	H	H	VH	VH	H
C ₃₂	H	H	M	H	M	H	VH
C ₃₃	M	M	L	M	M	M	H
C ₃₄	M	L	M	VL	L	L	M
C ₃₅	VH	H	VH	H	M	H	M
C ₃₆	M	M	H	H	M	M	H
C ₃₅	H	M	H	L	L	M	M
C ₄	VH						
C ₄₁	VH	M	L	H	M	H	VH
C ₄₂	H	H	M	VH	H	M	L
C ₄₃	VH	M	M	H	M	L	M
C ₄₄	VH	H	VH	H	VH	M	H
C ₄₅	M	L	M	VL	L	M	L
C ₄₆	VH	H	H	VH	VH	M	M
C ₄₇	H	L	VL	L	H	H	M
C ₄₈	H	M	H	VH	M	L	H
C ₄₉	M	M	M	H	H	M	VH
C ₄₁₀	M	H	M	VH	M	M	H
C ₄₁₁	VH	VL	M	M	H	VL	L

Ratings of alternatives at the sub-criteria level are aggregated to criteria level employing Eq. (2). Then, aggregated ratings are normalized via Eq. (3).

The weighted distances from ideal solution and anti-ideal solution are computed using Eqs. (4) and (5). The alternatives are ranked as in Table 4.

Table 4. Ranking of the alternatives.

Alternatives	P _i *	Ranking
A ₁	0.5486	5
A ₂	0.5865	3
A ₃	0.5419	6
A ₄	0.6197	1
A ₅	0.5838	4
A ₆	0.5875	2

4. Conclusions

This paper employs hierarchical fuzzy MCDM methodology to select the most suitable transportation service provider in a dye manufacturer in Turkey. Future researches may focus on calculating the weights of the evaluation criteria employing an analytical technique. Moreover, a group decision making framework can be utilized for the evaluation.

Acknowledgements

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Diagnosis of Entrepreneurial Intentions of University Students

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Abstract

This article presents an analysis of intentions to start a business by university students, with particular regard to those studying business, administration and law. The set of research proposals identifies (1) students' intentions to (not) continue family businesses (including maintaining / changing the existing business model of a family business) or take up a full-time job in the country or abroad, (2) perception of support given by family and friends in business development, and (3) students' entrepreneurial self-efficacy. Empirical research was carried out as part of the INTERGEN project. The period of collecting answers made by the students lasted from September 2018 to June 2019. A research sample of 1 424 university students from six countries (Albania, Bulgaria, Poland, Romania, Russia, and Serbia) took part in the research. By using the research sample consisting of 1 424 students, the findings show that business, administration and law students demonstrate rather low entrepreneurial intentions. In addition, it was found that attitudinal factors outweighed the students' self-perceived inability to develop their own businesses. Our findings showed that students positively perceive support given them by their families and friends. The findings suggest that the role of perceived university's support and the perception of support given by institutions providing professional activation of students in the formation of students' entrepreneurial intention is also worth researching. Universities should then address these needs in order to be more effective. Theoretical and practical implications are discussed, as well.

Keywords: students' entrepreneurial intention, students' entrepreneurial self-efficacy, family business environment, perceived family support

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A Comparative Analysis between Fuzzy Mapping Techniques for Success Evaluation of Home Office Process in COVID-19 Pandemic

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Abstract

COVID-19 pandemic has changed the processes and routines of business life. Employees have started to apply home office as part of the precautions of the infection. In this study, the factors that affect the success and efficiency of home office are evaluated, and their importance weights are determined. Causal links among the factors, positive as well as negative relations between pair of criteria, and lack of crisp data lead to employ fuzzy cognitive map as an appropriate methodology to success factors of home office in pandemic period. The application is illustrated through a case study, which is conducted in a consulting firm that performs in Turkey. The results are compared with intuitionistic fuzzy cognitive map technique. Intuitionistic fuzzy cognitive maps are used when interrelationships among evaluation criteria, fuzziness, vagueness, and hesitation in data are present.

Keywords: COVID-19 pandemic, home office, intuitionistic fuzzy cognitive map, hesitation

1. INTRODUCTION

Before the pandemic, the offices were critical to productivity, culture, and surviving in competitive market. Companies tried to locate their prime office in major urban centers around the world, and focused on solutions that were to promote collaboration. Densification, open-office designs, hoteling, and co-working were the battle cries [1].

COVID-19 pandemic increases the number of employees in home quarantine, hence it makes companies and organizations face brand new challenges. They should maintain the operations of the firm in such situation, and thus the solution is a controlled set-up of work from home [2].

Home office process has been efficient and useful for many employees. 80 percent of people reported that they enjoy working from home, whereas 41 percent say that they are more productive than they had been before and 28 percent that they are as productive [1].

This work introduces a fuzzy cognitive map (FCM) technique to determine the importance degrees of success factors of home office in pandemic period. Causal links among the factors, positive as well as negative relations between pair of criteria, and lack of crisp data lead to employ fuzzy cognitive map as an appropriate methodology to success factors of home office in pandemic period. The results are compared with intuitionistic fuzzy cognitive map tool.

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The remaining sections of the paper are organized as follows. Section 2 explains briefly cognitive map methodologies. The following section illustrates the application via a case study conducted in a consulting firm. Final section delineates conclusions and future research directions.

2. COGNITIVE MAP TECHNIQUES

2.1. Fuzzy Cognitive Maps

Fuzzy cognitive map (FCM) is a causal information-based tool that combines fuzzy logic and neural networks. The extension of the tool is provided by including fuzzy numbers or linguistic variables for expressing the causal links among concepts in the map. These concepts represent an entity, a state, a variable or a characteristic of a system, a behavior of the information-based system is denoted by concepts in FCM [3]. Concept nodes and weighted arcs are the elements of FCM which can be graphically showed with feedback. Signed arcs indicate the sign of causality: whether the causal relationship is positive, negative or null; and connected nodes produce causal relationships among concepts [4]. $C = \{C_1, C_2, \dots, C_n\}$ is the set of concepts, arcs (C_j, C_i) demonstrate how concept C_j causes concept C_i , and are used for causal relationships between concepts. The weights of causality links range can be represented with linguistic variables such as “negatively medium”, “zero”, “positively medium”, etc. The value of each concept is computed, taking into account the effect of the other concepts on the under-evaluation concept, by applying the following iterative formulation.

$$A_i^{(k+1)} = f \left(A_i^{(k)} + \sum_{j=1}^N A_j^{(k)} w_{ji} \right) \tag{1}$$

where $A_i^{(k)}$ is the value of concept C_i at k^{th} iteration, w_{ji} is the weight of the connection from C_j to C_i and f is a threshold function.

2.2. Intuitionistic Fuzzy Cognitive Maps

Intuitionistic fuzzy cognitive map (IFCM) technique includes intuitionistic fuzzy numbers into cognitive maps in order to determine the power of cause-and-effect relationships [5]. First, concept nodes and power of causal links among them are defined by obtaining experts’ opinions. Second, the power of causal links is represented by intuitionistic fuzzy numbers that are associated with intuitionistic fuzzy scale. Hence, membership, non-membership, and hesitation values are identified. Finally, $N \times N$ weight matrix is formed by employing the information collected from the experts.

The following iterative formulation of IFCM is run until the system will be stabilized, in other words, all factor weights will converge [6]. In this way, the concepts’ values are computed.

$$A_i^{(k+1)} = f \left(A_i^{(k)} + \sum_{j=1}^N A_j^{(k)} w_{ji}^{\mu} - A_j^{(k)} w_{ji}^{\pi} \right) \tag{2}$$

where $A_i^{(k)}$ is the value of concept C_i at k^{th} iteration, w_{ji} is the weight of the connection from C_j to C_i , w_{ji}^{μ} and w_{ji}^{π} denote the weight matrices that show membership values and hesitation values of causal links, respectively, and f is a threshold function, which is considered as sigmoid function for this work.

3. CASE STUDY

This work presents a FCM approach for evaluating success factors of home office in pandemic period. The case study is conducted in a consulting firm performing in Turkey through three experts' opinions. Initially, success factors that are determined by interviewing the project managers of the case company, are delineated in Table 1.

Table 1: Success factors of home office

Label	Concept
C ₁	Use of technologic devices
C ₂	Time scheduling
C ₃	Construction of a working area
C ₄	Planning the breaks between the meetings
C ₅	Maintaining communication among co-workers
C ₆	Planning housework
C ₇	Self-motivation
C ₈	Getting dressed as in the office

The decision-makers indicate the direction of causal relationships in three categories: positive, negative, null. Afterwards, experts decide the degree of causal links by using linguistic variables; subsequently linguistic variables are transformed into fuzzy numbers. In this study, nine linguistic terms are used as negatively very strong (nvs), negatively strong (ns), negatively medium (nm), negatively weak (nw), zero (z), positively weak (pw), positively medium (pm), positively strong (ps), positively very strong (pvs). The corresponding triangular fuzzy numbers for these linguistic variables are reported in Table 2.

Table 2: Scale of fuzzy numbers [4]

Linguistic term	Triangular fuzzy number
nvs	(-1,-1,-0.75)
ns	(-1,-0.75,-0.5)
nm	(-0.75,-0.5,-0.25)
nw	(-0.5,-0.25,0)
z	(-0.25,0,0.25)
pw	(0,0.25,0.5)
pm	(0.25,0.5,0.75)
ps	(0.5,0.75,1)
pvs	(0.75,1,1)

The matrix of power of causalities is given in Table 3.

Table 3. The matrix of power of causalities

	C ₁	C ₂	C ₃	C ₄	C ₅	C ₆	C ₇	C ₈
C ₁	0	0	0	0	(pvs,pvs,ps)	0	(pw,pw,pw)	0
C ₂	0	0	0	(pvs,ps,pvs)	(pw,pw,pw)	0	(pw,pm,pw)	0
C ₃	0	(pm,ps,pm)	0	0	0	0	(pvs,ps,ps)	0
C ₄	0	(pvs,ps,ps)	0	0	(pw,pm,pw)	0	(pw,pw,pw)	0

C ₅	(pm,pm,pm)	0	0	0	0	0	(ps,pm,ps)	0
C ₆	0	(ps,ps,ps)	0	0	0	0	(pw,pm,pm)	0
C ₇	0	(pvs,pvs,ps)	0	(pm,ps,ps)	(pw,pm,pm)	(pw,pw,pw)	0	0
C ₈	0	0	0	0	0	0	(ps,ps,ps)	0

The linguistic data collected by the experts are converted into triangular fuzzy numbers according to the fuzzy scale given in Table 2. The matrices of power of causalities that are transformed into triangular fuzzy numbers with regard to three experts. Afterwards, these triangular fuzzy numbers are aggregated via MAX aggregation, and then defuzzified by using COG method, and the weight matrix is obtained as in Table 4. MATLAB fuzzy tool box is used for these operations.

Table 3. Weight matrix

	C ₁	C ₂	C ₃	C ₄	C ₅	C ₆	C ₇	C ₈
C ₁	0	0	0	0	0.798	0	0.25	0
C ₂	0	0	0	0.798	0.25	0	0.375	0
C ₃	0	0.625	0	0	0	0	0.798	0
C ₄	0	0.798	0	0	0.375	0	0.25	0
C ₅	0.5	0	0	0	0	0	0.625	0
C ₆	0	0.75	0	0	0	0	0.375	0
C ₇	0	0.798	0	0.625	0.375	0.25	0	0
C ₈	0	0	0	0	0	0	0.75	0

The iterative formulation of FCM is run via FCMapper software for obtaining concepts' values. The resulting concept values are listed in Table 4.

Table 4: Values of concepts

Label	Concept	Weight
C ₁	Use of technologic devices	0.774989
C ₂	Time scheduling	0.968505
C ₃	Construction of a working area	0.659046
C ₄	Planning the breaks between the meetings	0.908020
C ₅	Maintaining communication among co-workers	0.923423
C ₆	Planning housework	0.724782
C ₇	Self-motivation	0.974098
C ₈	Getting dressed as in the office	0.659046

The results obtained from FCM are compared with intuitionistic fuzzy cognitive map technique to observe the outcomes of hesitation in data. The experts provide their opinions by reaching a consensus and they used the linguistic scale shown in Table 5.

Table 5: Linguistic Scale

Linguistic term	Intuitionistic fuzzy number
VH	<0.95,0.05>
H	<0.70,0.25>
M	<0.50,0.40>
L	<0.25,0.70>
VL	<0.05,0.95>

The linguistic data, membership values, non-membership values, and hesitation values for causal relationships, are given in Tables 6, 7, 8, and 9, respectively.

Table 6. Linguistic Data for Causal Relationships

	C ₁	C ₂	C ₃	C ₄	C ₅	C ₆	C ₇	C ₈
C ₁	-	-	-	-	H	-	L	-
C ₂	-	-	-	VH	M	-	VL	-
C ₃	-	M	-	-	-	-	VH	-
C ₄	-	VH	-	-	L	-	VL	-
C ₅	M	-	-	-	-	-	H	-
C ₆	-	H	-	-	-	-	VL	-
C ₇	-	VH	-	M	VL	L	-	-
C ₈	-	-	-	-	-	-	M	-

Table 7. Membership values

	C ₁	C ₂	C ₃	C ₄	C ₅	C ₆	C ₇	C ₈
C ₁	0	0	0	0	0.7	0	0.25	0
C ₂	0	0	0	0.95	0.5	0	0.05	0
C ₃	0	0.5	0	0	0	0	0.95	0
C ₄	0	0.95	0	0	0.25	0	0.05	0
C ₅	0.5	0	0	0	0	0	0.7	0
C ₆	0	0.7	0	0	0	0	0.05	0
C ₇	0	0.95	0	0.5	0.05	0.25	0	0
C ₈	0	0	0	0	0	0	0.5	0

Table 8. Non-membership values

	C ₁	C ₂	C ₃	C ₄	C ₅	C ₆	C ₇	C ₈
C ₁	0	0	0	0	0.25	0	0.7	0
C ₂	0	0	0	0.05	0.4	0	0.95	0

C_3	0	0.4	0	0	0	0	0.05	0
C_4	0	0.05	0	0	0.7	0	0.95	0
C_5	0.4	0	0	0	0	0	0.25	0
C_6	0	0.25	0	0	0	0	0.95	0
C_7	0	0.05	0	0.4	0.95	0.7	0	0
C_8	0	0	0	0	0	0	0.4	0

Table 9. Hesitation values

	C_1	C_2	C_3	C_4	C_5	C_6	C_7	C_8
C_1	0	0	0	0	0.05	0	0.05	0
C_2	0	0	0	0	0.1	0	0	0
C_3	0	0.1	0	0	0	0	0	0
C_4	0	0	0	0	0.05	0	0	0
C_5	0.1	0	0	0	0	0	0.05	0
C_6	0	0.05	0	0	0	0	0	0
C_7	0	0	0	0.1	0	0.05	0	0
C_8	0	0	0	0	0	0	0.1	0

IFCM technique is employed and importance weights of digital transformation factors are obtained by running the formulation (1) until it will be stabilized, and the values of concepts will remain same. FCMapper software is used for these operations. The concepts' values are given in Table 10.

Table 10: Importance weights of success factors

Label	Concept	Weight
C_1	Use of technologic devices	0.750669
C_2	Time scheduling	0.968866
C_3	Construction of a working area	0.659046
C_4	Planning the breaks between the meetings	0.899745
C_5	Maintaining communication among co-workers	0.878787
C_6	Planning housework	0.710448
C_7	Self-motivation	0.935570
C_8	Getting dressed as in the office	0.659046

4. CONCLUSIONS

To obtain the importance weights of success factors of home office during COVID-19 pandemic, evaluation criteria that influence success and motivation of employees that work remotely are determined through expert opinions and then algorithm of the work is reported by considering FCM technique. Importance weights of concepts are assigned by applying FCM methodology, time scheduling and self-motivation are the most important factors however construction of a working area and getting dressed as in the office are the least important criteria. The results are

compared with IFCM tool and very similar importance weights are achieved. Future research will focus on proposing group decision making approaches for success evaluation of home office process during pandemic.

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The Economic Reform and Problematic of Change Management Case: Albania

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Abstract

The development dynamic in the business organizations dictates the necessity of continuous changes of different dimensions and that mainly deal with domains such as technology, employers' qualification, the organization culture, its structure and strategies etc which are reflected with the economic progress of the business in the future. Because of its involvement rate and the expected consequences, the change is a critical moment for the organization as it spoils its status-quo and leads to another situations perspective, more advanced than the existing one. The change is important as it leads to growth and development. Thus the change acknowledgement and management is an important duty in order to achieve the set goals. The paper presents a real situation of a strategic economic sector in Albania during the transition period. In it we will analyze the transformations in one of the businesses of the heavy industry, under the specific conditions of the business and of the national economy in general.

Keywords: change, pressure to change, change management, KURUM International Sh.A

1. INTRODUCTION

During the last years of the 20th century, Albania oriented its economic activity toward the market economy, which was reflected in the country's social-economic life in all its dimensions. The country's economy during this period was composed by existing producing structures, which were very centralized enterprises, based on state property. According to this administration method of the enterprise, the expenses, as well as the income realized by these enterprises belonged to the state.

The last decade of the 20th century brought radical changes for Albania in the political, economic and social domains. Crossing from one developing strategy into another one i.e from the socialist system into the democratic one, faced the country with a great and difficult test related to creation of a new qualitative economic base.

During the years 1990-1991 there were efforts to develop the newly settling system in Albania, upon the old economic base, which was totally based on state property. Initially self-administration was allowed many enterprises in order for them to carry out independent economic activity. The conditions these enterprises were in, made it impossible for the enterprises to develop efficient self-administration economic activity and this for some reasons:

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- the centralized economy did not offer sufficient economic independence.
- the Albanian economy was based on very old technology.
- the enterprises were non-rentable and were highly supported by the state subsidies.

Generally, the great enterprises, those on the form of plants, which employed a considerable number of people, predominated.

The political and economic developments throughout Eastern and Central Europe, which included even Albania, faced the country's economy with a total collapse. Many enterprises closed for lack of financial means.

This situation indicated the necessity of changing the economic base determining as the first step the quick privatization of the economy. This process has been a long and difficult one. During this changing process many enterprises were closed or privatized. As it can be noticed during that period the change was present, from the macro and microeconomic point of view.

The change is a very wide notion. For the business organizations it represents a reparation or improvement made to something such as technology, organization form, in the method, quality etc. compared to the previous state. The economic system at present is generally characterized by trends toward the economic globalization. In these conditions, the change is not only inevitable as it emphasizes and Morgan (2015), but as well quick. For Thompson (2018): "There are three types of change in a business context: developmental, transitional and transformational change.

A developmental change occurs when a business wishes to improve a process or procedure, such as updating the payroll system or refocusing its marketing strategy. A transitional change is an act of replacing major processes with new ones, such as automating your manual production line or adopting a new ERP installation. Transformational change is the most disruptive since it requires a fundamental shift in the way a company operates".

Kern (2003) stressed: "Change management is especially critical in today's....". While Morgan (2015) thought: "Change is never easy. There is nothing wrong with change, if it is in the right direction". Thus it does not represent a process towards equilibrium, but a continuous adoptive situation of the organization to the environment which as well changes continuously. Kern (2003) defines change management as a process that goes through six steps. In summary they are:

Step 1: Define change management process and practices

Step 2: Receive change requests

Step 3: Plan for implementation of changes

Step 4: Implement and monitor the changes; back out changes if necessary

Step 5: Evaluate and report on changes implemented

Step 6: Modify change management plan if necessary.

The global and the technology changes indicate the finding of innovating forms for the business organizations about the method of their inner organization and functioning and the relationship administration with the outside environment actors.

Changes in the global economy are fast therefore, the businesses that do not quickly adopt with it, risk their economic and trade position. The economic problems complexity means, beside others that the change is an inevitable process in many directions. Whereas, changes in technique and technology do not constitute a new phenomena, on the contrary, they constitute a phenomenon that indicates an accelerated development trend. "The new economy", "the network economy" dictate new ways of doing business and which are a change that is growing

exponentially where the individual changeability composes an important development factor. So “people know we are in trouble and need to change” (Kotter, 2008).

This situation re-estimates the human capital in quantity and quality terms. The individual creativity and enabling constitutes a problem that conditions the change toward development. The change pointed out many social-economic problems, which deserve to be studied, alternatives to be determined and options to be recommended for solution. This, because of the fact that the change should be carefully managed, as the post-change situation, is characterized by a remarkable fragility. The lack of attention towards this managerial situation makes the manager incapable to afford the competition, placing him outside the frames of the opportunities to benefit from the trade conjunctures. “They may be caused by changes in technology, changes in customer needs or other events” (Porter, 2008).

The necessary things to make business are: the object, the technology, the human resources and the market. This last one orients the technological changes and those in the human resources. Therefore the change itself is a permanent phenomenon present in all the businesses. Based on Akhras (2017), since 1951 Kurt Lewin defined in his book: *Field Theory in Social Science*, three classical steps of the change model: “... unfreezing the status quo, movement to a new state, and refreezing the new change to make it permanent”. The change creates a problematic situation from the business organization, as well as from the managerial and employees point of view.

For the business organization preparations to change has to do with its efforts to cope with this change the lowest cost possible in order to be efficient in the market.

From the managerial point of view, it refers to the architecture drafting of the change, the work tools, the producing or operation methods, the acknowledgement of the speciality or the experiments that should be used for the duty accomplishment. Changes in this case should be seen in both its important direction - in that of developing responsibility and in its human content.

From the employers point of view, when change happens, the people are still unclear about the information they should have, the ways and methods of cooperation etc. Thus the human content of the change has to do with the impacts it has in the work facilitation, in the wellbeing, in the need for training etc. The most important thing is to find ways to help people.

The continuous changes bring a new pressure on the organization to make other changes related to the human resources, duties defined and the structure. Thompson (2020) refers Sirkin, Keenan and Jackson (2005) stressed: “the authors were able to show that the outcome of change initiatives come down to just 4 basic elements - DICE:

- (D)uration of the project
- (I)ntegrity of the team
- Organizational (C)ommitment to change
- Additional (E)ffort required of staff members”.

Considering it, in its complexity, the change management constitutes a central problem, whose management requires theoretical and practical acknowledges. The creation and development of each private overtaking is a very dynamic process. It is associated with a series of phenomena unknown before. As a result, generally in the cases of the privatization and selling business, the change has got technological, financial and human resources dimensions.

The paper entitled “The economic reform and problematic of change management - Case: Albania” concentrates in the human resources dimensions. The change process analysis as a normal phenomenon in all the dimensions, constitutes a necessity because the bad management leads to bankruptcy. For this, Thompson (2020) refers Sirkin, Keenan and Jackson (2005) for DICE suggests that: “The significance of this is that DICE provides you with a simple and well-evidenced technique to enable you to conduct a risk assessment of a proposed change before you start it”. While after four years Sirkin, Keenan and Jackson (2009) suggest scaling up the factors. In this context they emphasize: “The DICE score is calculated according to the following formula:

$$D + (2 \times I) + (2 \times C1) + C2 + E$$

Duration

< 2 months = 1

2-4 months = 2

4-8 months = 3

> 8 months = 4

Team Performance Integrity

Very good = 1

Good = 2

Average = 3

Poor = 4

Commitment (Senior Management)

Clearly and strongly communicate the need = 1

Seem to want success = 2

Neutral = 3

Reluctant = 4

Commitment (Local)

Eager = 1

Willing = 2

Reluctant = 3

Strongly Reluctant = 4

Effort

< 10% additional = 1

10-20% additional = 2

20-40% additional = 3

> 40 % additional = 4”.

Based on the above, Sirkin, Keenan and Jackson (2005) recommended that: “A DICE score between 7 and 14 is in the "Win" Zone (very likely to succeed), while a DICE score between 14 and 17 falls in the "Worry" Zone (hard to predict success), and a DICE score higher than 17 falls in the "Woe" Zone (indicating high unpredictability or likely to not succeed)”. The DICE score is very important. Kelchner (2019) established that: “Effective change management requires the business to identify the desired result of the change and a means to measure success”. Despite its importance, DICE reserves a considerable degree of subjectivism. In this context, the manager's attention should be focused on the most realistic point assessment of each factor. This is important as the DICE assessment is a preliminary assessment.

Regarding the above, the change management is a problematic situation. Therefore, in order to succeed optimism is required.

The main objective of this paper is to present the results of the survey on the human resources developments in the conditions of post-privatization changes, blockage that change causes in the Metallurgical Combine Plant, now KURUM International Sh.A. in Elbasan.

The accomplishment of such an objective orients the research activity towards specific objectives such as:

- ✓ To prove the necessity of the change management.
- ✓ To make evident the human resources role in the change management.
- ✓ To make evident the change challenges.
- ✓ To deal with the found problematic related to the change and present the possible improvements.

Finally, this study will serve the managers in Albania for drafting new methods in situation of change.

Currently the human resources in this business regarding the managerial staff as well as the employees, consist of domestic and foreign employees who condition some of managing change directions. This change generally follows two directions up-down and down-up and this is related to the first duty of the manager who should determine whether the change will either unilateral or bilateral, and on this basis he determines his power and authority position. In our case the change is unilateral, as the employees give unconsiderable contribution in this change.

Often changes in the business organization make that the individual acknowledgements and skills gained at work for a long time become out of dated and old. Therefore, it is the employees’ responsibility to follow their manager’s instructions. Despite the importance of the change, Hamlin (2017) thinks that: “Few people enjoy change, whether at work or in their personal lives. Whether they resist out of fear of how the change will affect them or simply because making lasting change takes a lot of work, many organizational change efforts fail because of resistance”.

2. METHODOLOGY

Researchers have shown that the change is associated with consequences in the business, which cannot be immediately tackled. Therefore the situation was diagnosed in order to clarify the state and the problems related to the change. Diagnosis of the situation requires its perception. Therefore, the methodology consists of the theoretic accomplishment and the work on the ground.

Theoretical accomplishment is related to the data provided by the read literature, data gathered from the official editions from the Ministry of Transportation and Energy, the General Directorate of Taxation and the unofficial ones.

The work on the ground refers to the data gathered from the interviews with specialists and managers of the KURUM International Sh.A. prepared for this study. Probing questions are used for more detailed information. KURUM International Sh.A. is of greatest enterprises involved in the change process.

3. Results

KURUM International Sh.A. is the only iron complex and the one of the largest private sector companies in the country. After more than two decades in Albania, KURUM International Sh.A. cover about 85% of the domestic market.

According to the General Directorate of Taxation data it comes out that the KURUM International Sh.A. company has a total of 665 employees from which about 10% belong to the Turkish nationality. Management staff vision is to be an innovative, competitive and leading company in the iron, steel and energy manufacturing industry. They admit that: We never stop developing our knowledge, skills and capacities.

KURUM International Sh.A. develops its activity in the environment of the Former Metallurgical Plant. In this context, the change and its management posed a significant challenge. Built in 1978 the Metallurgical Combine Plant is for sure a great investment and at the same time a considerable load for the state, to which it dedicated only the socialist administration method of the enterprise. Since that time till the end of the 90's Metallurgical Combine Plant produced several articles using basically the domestic raw material.

With the change of politic and economic system, for many years this business had a full stagnation remaining closed. Metallurgical Combine Plant is an important sector in the terms of the contribution it has in the economic growth. Because of this in 1998 the concessionary contract was signed and in 2009 Metallurgical Combine Plant was privatized being sold to the Turkish company KURUM International Sh.A. Currently only the steel production line is operating.

The KURUM company, since the beginning of its activity faced the change effects. During the study, it came out that:

- the privatization of the Metallurgical Combine Plant in Elbasan from the point of view of the domestic economy aimed at reactivating this sector and using the domestic natural wealth such as the iron - nickel, coals, ect. Whereas from the KURUM International Sh. A. point of view the engagement in this business is preceded from the SWOT analysis, for which I think there have been considered these factors:

SWOT Analysis

The strong points:
Cheap working force Cheap domestic raw material. Previous investments (existing buildings) Insufficient domestic investment power.
Weak points:
Quite old technology Lack of motivation from the domestic business
The opportunities:
The presence of a boom of buildings as the result of high immigration rate. Increasing market request for iron and steel products. Favorable government policies for the business development.
Threatens:
The road infrastructure appropriate for the high tonnage vehicles carrying iron rods of different dimensions.

Source: I.CANCO file

- the employees of the KURUM company belong to young age as 83% of them are about 50 years old. From the probing questions it comes out that has been as well the managers' request. The greatest part of the

employees (91% of them have the high education. Whereas the employees of the mechanic profile includes 48% of the group, which is a specific for the business kind itself.

- the challenges of change are generally differentiated and they are conditioned from the employees' work experience. In this business it is noticed that two groups of domestic employees are employed. In more concrete terms, the "old" employees who can at a certain degree can be called professionals as they have worked in the Metallurgical Combine Plant. In this group, there can be involved the employees with more than 13 years of experience who constitute 86% of the respondents. The "new" employees (12% of the respondents) are those who have not had to do before with such business and have no more than 5 years of work experience. A very small part represented by 2% are the employees who have 6-10 years of work experience, who as it came out even from the questions have worked in small work-shop of metal processing. This representation rate is totally justified because of the fact that for a long time this kind of business has not been operating because being a state enterprise it was a load for the Albanian economy. Whereas for a private business it was very difficult not to say impossible the engagement of Albanian businessmen, as their available economic power was fragile and insufficient for engagement in businesses of that size.

The both groups of domestic employees have faced the change challenge, but in different dimensions. The first difficulty which is very widespread is the difficulty of communication with the Turkish managers and colleagues. For Passenheim (2010): "Communication is one of the most important factors in a change process" Difficult from the Turkish language rated on the first place by 100% of the respondents. This difficulty is still present even at the moment when the study was carried out. This challenge was faced in two phases.

The first phase

Turkish translators were initially used. This way faced the business additional costs.

The second phase was realized with the organization of Turkish language courses about

- o knowledge of the language
- o knowledge of professional terminology

This management was successful one

The second change challenge is the performing work. This derives from:

- disconnection from the profession 72 % of the responders
- the changes of job requirements from the managers with 69 % of the respondents.

This challenge is more easily afforded by the employees who had over 11 years of work experience who, even though they have been disconnected from their profession still they feel more comfortable professionally. But, this does not happen with the new employees of less than 10 years of work experience. A part of these last ones has the high professional education of different specialties, because the mechanic specialty was a deprivation for them. During the period after the political changes in Albania no mechanical plant was into function. Because of this lack they have not had the chance to practice in any cases.

This has been the most difficult challenge. Staff organized:

- group training at different levels
- individual on-the-job training

Individual on-the-job training is more successful.

Difficulties encountered during the change have been mainly handled by the manager who has stayed calm, a much-evaluated characteristic during the change periods. This characteristic is made evident from 52% of the respondents. Whereas 41% of them, express about the optimism of the manager, something that has helped the employees to adopt with the new situation. Only 7% say: the manager is sometimes nervous. This made that 41% of the employees consider the work and the emotional load affordable while 59% have considered it as difficult or very difficult. In this last group generally the new employers predominate, and their response for this question should be considered not only as a workload, but as the cost of getting used with their duty, which is as well confirmed from the probing questions.

Generally, the change in KURUM International SH.A. has not faced visible resistance from the employees. As shown in the survey the change situation is accepted as normal from the employees. This is because the change did not happen during the time that the company was active on the contrary, it happened after a long activity pause. In these conditions the property and organizational change in KURUM is considered as an alternative of employment for the employees (100% of the respondents). As a result it has not been necessary for the managers and directors responsible for the change, help and prepare people to accept that.

Regarding the “class” question, the employees emphasized that the technology does not have any noticeable difference, something that did not invalidate their acknowledges totally. One of the changes that the employees single out is the change of the salary. However we should admit that compared to the previous period in Albania after 1992 another monetary system is present. Again the salaries have great increasing changes up to 2.5 - 3 times. The work environment has changed as well as the foreign employees have transferred their technology and work culture.

In these conditions 95% of the respondents answered negatively the question: “Would you like to change this profession?”, which demonstrates that the management team has successfully managed the challenges of change.

4. Conclusions:

Based on the study and data gathered on the change and its management in KURUM International Sh.A. company we can come to some conclusions such as:

- the change in KURUM International Sh.A. company has been a complex situation, combining the change situation and the situation of starting a business. This characterized the change management in this business by several specifics.
 - from the interview with the KURUM International Sh.A. company managers it resulted that they generally had not forecasted the change management step by step, which would make their job more successful. This situation is due to the fact that the responsibility for all the company’s activity is delegated to the Turkish managers. The Albanian specialists have been given other managing level duties.
- ✚ Special in this paper is the use of DICE statistics, as a recommendation for the future of efficient change management.
 - ✚ It is recommendable that the matrix “CHANGE” is drafted. In our case with KURUM International Sh.A. company for some of the problems encountered the Matrix “CHANGE” become as follow:

RESPONSIBILIT

No.	Problems expected to be encountered	Top level	Middle level	Low level
1	Difficulties of communication between the employers (the Turkish language) a. Translation		X	XX
2	Problems in accomplishing the duties a. Training b. Guidance in the workplace c. Control in the workplace		XX	X XXX XXX
3	Problem with achieving the expected performance a. Observation and assistance b. Managerial intervention		X	X XXX

4	Decreasing optimism a. Motivation b. Competences additions	XXX	XXX XX	XX X
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Note: X – low responsibility; XX – average responsibility; XXX – high responsibility

On this basis the manager drafts detailed plans and delegates the responsibilities facing in advance the problems expected from the change.

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Topic Modelling-Based Identification of Socio-Economic and Epidemiological Issues from News Documents

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Abstract

Significant text documents on a variety of subjects, including socioeconomic and epidemiological issues, are shared on the Web because of advancements in information technology. Text-based posts such as news articles, disease reports, and news bulletins shared on various Internet platforms also provide critical information for early detection of emerging infectious disease outbreaks. Additionally, this information is critical for developing web-based bio surveillance systems. The continuous growth in the number of news articles published on the web complicates the use of these sources to forecast disease, epidemics, and socioeconomic factors. Thus, to develop an effective web-based bio surveillance system, text mining and machine learning-based systems that efficiently and accurately assign news texts to relevant topics are required. In topic modeling, documents are represented by a mixture of topics, topics by a probability distribution over words, and topics by a probability distribution over topics. The predictive performance of topic modelling models was evaluated in this study when used in conjunction with conventional classification algorithms and ensemble learning algorithms for identifying socioeconomic and epidemiological aspects in text documents. The empirical results indicate that the utilization of topic-modelling based approaches in conjunction with ensemble classifiers can yield promising results for the identification of socioeconomic and epidemiological issues from text documents.

Keywords: text mining, ensemble learning, topic modelling, latent Dirichlet allocation, news classification

1. INTRODUCTION

Significant text documents on a variety of subjects, including socioeconomic and epidemiological issues, are shared on the Web because of advancements in information technology. Text-based posts, such as news articles, disease reports, and news bulletins shared on various Internet platforms also provide critical information for early detection of emerging infectious disease outbreaks. It is noted that a sizable portion of the world's initial news about infectious disease outbreaks came from unofficial posts made on various Internet channels. The World Health Organization (WHO) discovered that nearly all major epidemics examined were initially spread via unofficial sources on the Internet [1]. Additionally, this information is critical for developing web-based bio surveillance systems. Web-based, event-driven bio surveillance or digital disease detection systems rely on unstructured data retrieved from a variety of web-based sources to provide early warning and awareness of chemical, radiological, and nuclear threats to humanity, as well as infectious diseases affecting humans, animals, and plants [2]. Web-based bio surveillance systems complement traditional indicator-based methods of public health surveillance in real time. It enables both government organizations and public health professionals, and the public and private sectors to manage epidemics effectively and appropriately [3]. With the advancements in Internet technologies, web-based, event-

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driven bio surveillance systems have emerged as a critical decision support system for monitoring and modelling epidemiological data. Users can independently report public health events via a variety of Internet channels, including social media platforms, using outbreak surveillance via web-based bio surveillance systems. This makes it impossible to maintain or delay the sharing and reporting of public health information from a single source [4]. Additionally, web-based bio surveillance systems can provide much faster notification of an outbreak than conventional surveillance systems, as they do not require protocols or confirmatory tests prior to notification [5].

Topic modelling is a field of statistical modelling employed to identify abstract topics within a collection of documents. In this scheme, documents have been represented as a mixture of topics, topics have been represented as a probability distribution over words, and documents have been represented as a probability distribution over topics [6]. The latent Dirichlet allocation (LDA) algorithm is a type of topic modelling to assign text in a document to a specific topic.

To develop an effective web-based bio surveillance system, text mining and machine learning-based systems are required that quickly and accurately assign news texts to appropriate topics. The high dimensionality of the feature space and the sparsity of the features are two significant issues that have been faced by conventional text mining representation schemes. By using latent topics extracted from text documents as features rather than many words, the curse of dimensionality can be overcome and text classifiers' predictive performance improved [7].

In this study, the performance of topic modelling-based schemes, conventional classification algorithms, and ensemble learning algorithms was evaluated using a collection of ASF, an animal viral disease, and news texts discussing socioeconomic issues regarding ASF. The empirical findings indicate that combining topic modelling and ensemble classifiers can produce promising results for identifying socioeconomic and epidemiological issues in text documents.

The following is the remainder of the study: In Section 2, the related work on the field has been presented. In Section 3, the methodology of the paper has been given. Section 4 discusses the experimental procedure and the results. Finally, Section 5 presents the concluding remarks of the study.

2. RELATED WORK

The global public health intelligence network project, which began in 1997 in collaboration with the World Health Organization (WHO), is one of the primary studies on web-based bio surveillance systems [8]. This project was created to aid in the detection and reporting of potential diseases and other health threats throughout the world. The system monitors and controls epidemic diseases by collecting data in nine different languages from approximately 32,000 online sources, including news sharing systems [9].

Another web-based bio surveillance project completed in 2014 by the European Commission's joint research center is the medical information system project. This project collects data in forty different languages from over a hundred medical websites and approximately a thousand news sharing websites to monitor for potential epidemics globally [10]. Similarly, the Argus project at Georgetown University's Faculty of Medicine in the United States of America conducts bio surveillance for epidemic diseases that have the potential to threaten human, plant, or animal health. The purpose of this project is to collect news data on infectious diseases from a variety of sources, including official sources such as the World Health Organization, and to interpret the data collected based on their relevance to appropriate concepts, search terms, and queries. The Argus system analyses data extracted from articles and other sources written in more than forty different languages [11].

Another project in the field of web-based bio surveillance is the Boston Children's Hospital's HealthMap initiative, which began in 2006 [8]. This project obtains information on human, plant, and animal diseases, as well as geographical names, from a medical dictionary that is updated on a regular basis. The system's data source is a collection of data from a variety of sources, including Google news, bio-surveillance reports, and approved official warnings and announcements. Within the scope of the project, articles are assigned to appropriate topics based on disease and location, automatically tagged, and visually presented on a geographic map using machine learning classification algorithms [12].

Similarly, the University of Melbourne implemented an international biological surveillance system in 2013. The data sources for this project were general search patterns, news articles, and blog posts obtained via search engines. Thus, it is possible to detect and monitor communicable diseases in plants and animals early [13].

In another study, Onan [14] examined the predictive performance of conventional text representation schemes, conventional classifiers, and ensemble learning methods on ASF corpus. Text classification is a critical subfield of text mining that involves classifying a text document into one or more predefined categories or classes [15]. Text

mining has been applied successfully in a variety of fields, including web page classification [16], sentiment analysis [17-22], and spam filtering [23]. To develop an effective web-based bio surveillance system, it is critical to assign high-performance text documents to appropriate topics.

3. METHODOLOGY

This section presents the methodology of the study, namely, the latent Dirichlet allocation, supervised learning algorithms and ensemble learning algorithms have been presented.

3.1. Latent Dirichlet Allocation

The latent Dirichlet allocation model (*LDA*) is a probabilistic generative topic model in which each document is represented by a random mixture of latent topics and each topic by a distribution over a fixed set of words [24]. The purpose of LDA is to deduce the underlying latent topic structure from observed data. Each document's words serve as the observed data in LDA. The words are generated in two stages for each document in the corpus. To begin, a random distribution of topics is chosen. A random topic from the distribution over topics is chosen for each word in the document based on this distribution [25]. In LDA, a word is a discrete data point from a vocabulary denoted by the indices $\{1, \dots, V\}$, a sequence of N words is denoted by $w = (w_1, w_2, \dots, w_n)$, and a corpus is a collection of M documents denoted by $D = \{w_1, w_2, \dots, w_M\}$. Figure 1 summarizes the generative process of LDA.

For each document w in a corpus D :

1. Choose $N \sim \text{Poisson}(\xi)$.
2. Choose $\Theta \sim \text{Dir}(\alpha)$.
3. For each of the N words w_n :
 - a. Choose a topic $z_n \sim \text{Multinomial}(\Theta)$.

Choose a word w_n from $p(w_n | z_n, \beta)$, a multinomial probability conditioned on the topic z_n .

Fig. 1. The generative process of LDA [24]

LDA can be modeled using a three-level Bayesian graphical model, in which random variables are represented by nodes and possible dependencies between variables are represented by edges, as illustrated in Figure 2. The Dirichlet parameter Θ refers to document-level topic variables, z refers to per-word topic assignment, w refers to the observed word, and β refers to the topics in this representation. As seen in the three-layered representation, α and β parameters are sampled once during corpus generation, document-level topic variables are sampled for each document, and word-level variables are sampled for each document word [24].

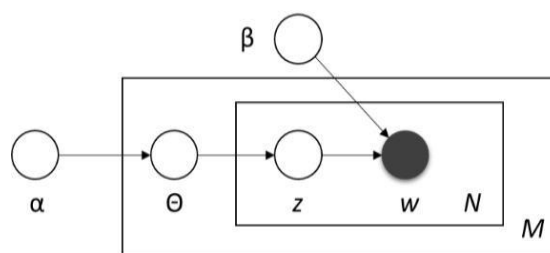


Fig. 2. The graphical representation of LDA [24]

Calculating the posterior distribution of the hidden variables for a particular document is a critical inferential task in LDA. Exact inference of the hidden variables' posterior distributions can be an intractable problem. As a result, approximation algorithms such as Laplace approximation, variational approximation, Gibb's sampling, and Markov chain Monte Carlo are frequently used in conjunction with LDA [24, 26].

3.2. Supervised Learning Algorithms

This section discusses the machine learning classifiers that were used in the empirical analysis as supervised learning methods.

The Naïve Bayes algorithm (NB) is a Bayesian classification algorithm constructed based on Bayes' theorem. The Naïve Bayes algorithm is a straightforward, computationally efficient classification algorithm with a high predictive performance due to its independence assumptions. In terms of predictive performance, it can outperform other learning algorithms with more complex structures and lower computational efficiency [27].

Logistic regression (LR) is a classification technique that uses linear relationships to classify data. Using a linear function of a set of predictor variables, logistic regression models the likelihood of an event occurring [28]. Linear regression has the potential to produce outstanding results. However, linear regression cannot always generate membership values in the [0-1] range, which is inconsistent with probabilities. A linear model is constructed on the transformed target variable in logistic regression, resolving the previously mentioned issues.

K-nearest neighbor (KNN) is an instance-based classifier. The algorithm identifies the classification model by comparing the instances to the k closest training instances [28].

SVMs are classification algorithms for both linear and nonlinear data [29]. Through non-linear matching, SVM converts the initial data set to a higher dimension. The purpose of SVM is to determine the optimal decision boundary for classifying various classes.

3.3. Ensemble Learning Algorithms

Ensemble learning algorithms are machine learning models that assign class labels to instances to be classified based on the output of multiple learning algorithms rather than a single classification algorithm. In comparison to basic classifier algorithms, ensemble learning algorithms are expected to exhibit superior generalization capabilities and a lower risk of overfitting [30]. The remainder of this section will provide a brief overview of the ensemble learning algorithms used in the study.

The bagging algorithm begins by randomly sampling subsets of the training set. Then, by training basic learning algorithms on subsets, learning models are created. The outputs of the basic learning algorithms are subjected to majority voting to determine the class label for the to-be-classified sample [31].

The boosting algorithm is designed to recursively train basic learning algorithms on training sets with varying distributions and then combine the learning models obtained from the basic learning algorithms to produce a single powerful classifier [32]. The AdaBoost (adaptive boost) algorithm increases the weight values of relevant samples incrementally to place a greater emphasis on difficult-to-classify samples. In the experimental analysis, the AdaBoost algorithm was used.

As with the bagging algorithm, the random subspace algorithm (RS) is an ensemble learning algorithm in which basic learning algorithms are trained using samples from the training set. However, in this case, different subsets of the training set are obtained using feature-space segmentation rather than sample-based segmentation [33].

Majority voting is one of the most frequently used aggregation rules for combining classification algorithms. The outputs of the basic learning algorithms that comprise the classifier community are subjected to a majority game, with the class label receiving the most votes being chosen as the community's class label [15].

4. EXPERIMENTAL RESULTS

This section contains information about the dataset used in the experiment, the methods used to implement it, and the experimental results. The experimental analysis made use of the ASF corpus. The ASF review is a compilation of news articles about socioeconomic issues and ASF, an animal viral disease [34]. 69 news articles on epidemiological topics are included in the ASF corpus. These articles contain textual evidence supporting the suspicion of ASF, as well as basic information on unknown diseases or unexplained clinical findings in a variety of animals. Similarly, there is a second category in the dataset that contains 69 news items about the socioeconomic impact of the ASF outbreak on a country or region. The scikit-learn library in Python is used to implement the basic learning algorithms and ensemble learning algorithms used in experimental analysis. We have utilized Gensim module to employ LDA-based topic modelling. Using tenfold cross validation, classification accuracy, F-measure, precision, and recall of learning algorithms were evaluated in the experimental analysis.

In Table 1, the classification accuracy values obtained by supervised learning algorithms and ensemble methods have been presented. The highest predictive performance among supervised learning methods has been obtained by Naïve Bayes algorithm, and the second highest predictive performance has been obtained by support vector machines algorithm. The third highest predictive performance has been obtained by logistic regression algorithm and the lowest predictive performance has been achieved by k-nearest neighbor algorithm. In the empirical analysis, ensemble methods have been also taken into consideration. The highest predictive performances among ensemble learning methods have been generally achieved by the random subspace method, which is followed by the majority voting scheme. The highest predictive performance among all the compared configurations has been obtained by random subspace ensemble of Naïve Bayes with a classification accuracy of 92.47%. In the empirical analysis, five different number of topics have been considered to represent text documents with the latent Dirichlet allocation algorithm. Regarding the different number of topics, the highest performance has been achieved for the number of topics is equal to 200, which is followed by the number of topics is equal to 250 and 150, respectively. In Tables 2-4, the precision, recall and F-measure values obtained by classification algorithms and ensemble methods have been presented.

Table 1. Classification accuracy values obtained by classifiers and ensemble learning methods

Classification Algorithm	Number of topics				
	50	100	150	200	250
NB	86,98	87,13	87,14	87,31	87,14
LR	81,79	81,90	81,97	82,44	82,03
KNN	76,14	78,11	79,04	81,74	80,09
SVM	86,73	86,74	86,81	86,89	86,82
Bagging+NB	87,74	87,74	87,92	88,13	87,98
Bagging+LR	83,60	83,76	84,06	84,44	84,20
Bagging+KNN	82,93	83,13	83,19	83,55	83,23
Bagging+SVM	87,39	87,43	87,44	87,72	87,52
AdaBoost+NB	88,87	88,89	88,98	89,40	89,18
AdaBoost+LR	85,33	85,65	85,89	86,06	86,03
AdaBoost+KNN	85,02	85,09	85,10	85,17	85,15
AdaBoost+SVM	88,15	88,34	88,36	88,74	88,41
Random Subspace+NB	91,60	91,67	91,67	92,47	92,43
Random Subspace+LR	86,43	86,50	86,51	86,56	86,52
Random Subspace+KNN	86,10	86,11	86,22	86,31	86,30
Random Subspace+SVM	89,76	89,80	89,88	90,13	90,12
Majority voting	90,28	90,87	91,03	91,43	91,35

Table 2. Precision values obtained by classifiers and ensemble learning methods

Classification Algorithm	Number of topics				
	50	100	150	200	250
NB	0,88	0,88	0,88	0,88	0,88
LR	0,83	0,83	0,83	0,83	0,83
KNN	0,77	0,79	0,80	0,83	0,81
SVM	0,88	0,88	0,88	0,88	0,88
Bagging+NB	0,89	0,89	0,89	0,89	0,89
Bagging+LR	0,84	0,85	0,85	0,85	0,85
Bagging+KNN	0,84	0,84	0,84	0,84	0,84
Bagging+SVM	0,88	0,88	0,88	0,89	0,88
AdaBoost+NB	0,90	0,90	0,90	0,90	0,90

AdaBoost+LR	0,86	0,87	0,87	0,87	0,87
AdaBoost+KNN	0,86	0,86	0,86	0,86	0,86
AdaBoost+SVM	0,89	0,89	0,89	0,90	0,89
Random Subspace+NB	0,93	0,93	0,93	0,93	0,93
Random Subspace+LR	0,87	0,87	0,87	0,87	0,87
Random Subspace+KNN	0,87	0,87	0,87	0,87	0,87
Random Subspace+SVM	0,91	0,91	0,91	0,91	0,91
Majority voting	0,91	0,92	0,92	0,92	0,92

As it can be seen from the empirical results listed in Tables 2-4, the experimental results valid for classification accuracy values are also valid for precision, recall and F-measure values. The highest predictive performance among supervised learning methods has been obtained by Naïve Bayes algorithm, and the second highest predictive performance has been obtained by support vector machines algorithm. The highest predictive performance has been achieved when the number of topics is equal to 200. The highest predictive performances among all the compared schemes in terms of precision, recall and F-measure have been obtained by random subspace ensemble of Naïve Bayes algorithm.

Table 3. Recall values obtained by classifiers and ensemble learning methods

Classification Algorithm	Number of topics				
	50	100	150	200	250
NB	0,88	0,89	0,88	0,88	0,88
LR	0,83	0,83	0,83	0,83	0,83
KNN	0,77	0,80	0,80	0,83	0,81
SVM	0,88	0,88	0,88	0,88	0,88
Bagging+NB	0,89	0,89	0,89	0,89	0,89
Bagging+LR	0,85	0,85	0,85	0,85	0,85
Bagging+KNN	0,84	0,85	0,84	0,84	0,84
Bagging+SVM	0,88	0,89	0,88	0,89	0,88
AdaBoost+NB	0,90	0,91	0,90	0,90	0,90
AdaBoost+LR	0,86	0,87	0,87	0,87	0,87
AdaBoost+KNN	0,86	0,87	0,86	0,86	0,86
AdaBoost+SVM	0,89	0,90	0,89	0,90	0,89
Random Subspace+NB	0,93	0,93	0,93	0,94	0,93
Random Subspace+LR	0,87	0,88	0,87	0,88	0,87
Random Subspace+KNN	0,87	0,88	0,87	0,87	0,87
Random Subspace+SVM	0,91	0,91	0,91	0,91	0,91
Majority voting	0,91	0,93	0,92	0,92	0,92

Table 4. F-measure values obtained by classifiers and ensemble learning methods

Classification Algorithm	Number of topics				
	50	100	150	200	250
NB	0,88	0,88	0,88	0,88	0,88
LR	0,83	0,83	0,83	0,83	0,83
KNN	0,77	0,79	0,80	0,83	0,81
SVM	0,88	0,88	0,88	0,88	0,88
Bagging+NB	0,89	0,89	0,89	0,89	0,89
Bagging+LR	0,84	0,85	0,85	0,85	0,85
Bagging+KNN	0,84	0,84	0,84	0,84	0,84
Bagging+SVM	0,88	0,89	0,88	0,89	0,88

AdaBoost+NB	0,90	0,90	0,90	0,90	0,90
AdaBoost+LR	0,86	0,87	0,87	0,87	0,87
AdaBoost+KNN	0,86	0,86	0,86	0,86	0,86
AdaBoost+SVM	0,89	0,90	0,89	0,90	0,89
Random Subspace+NB	0,93	0,93	0,93	0,93	0,93
Random Subspace+LR	0,87	0,88	0,87	0,87	0,87
Random Subspace+KNN	0,87	0,87	0,87	0,87	0,87
Random Subspace+SVM	0,91	0,91	0,91	0,91	0,91
Majority voting	0,91	0,92	0,92	0,92	0,92

To summarize the main findings of the empirical analysis, Figure 3 summarizes the empirical results regarding the classification algorithms and number of topics in terms of accuracy and Figure 4 summarizes the empirical results regarding the classification algorithms and number of topics in terms of F-measure values. As can be seen from the empirical results, ensemble learning methods outperform the conventional supervised classification algorithms for identification of socio-economic and epidemiological issues from news documents.

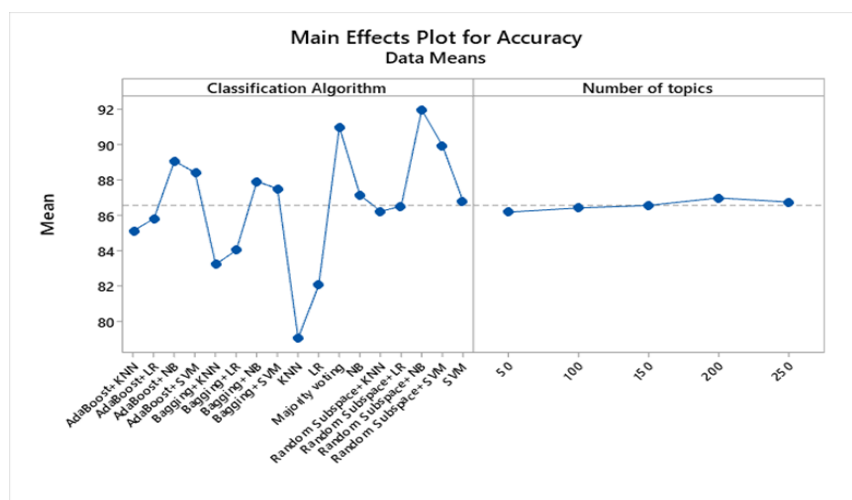


Fig. 3. The main effects plot for accuracy values

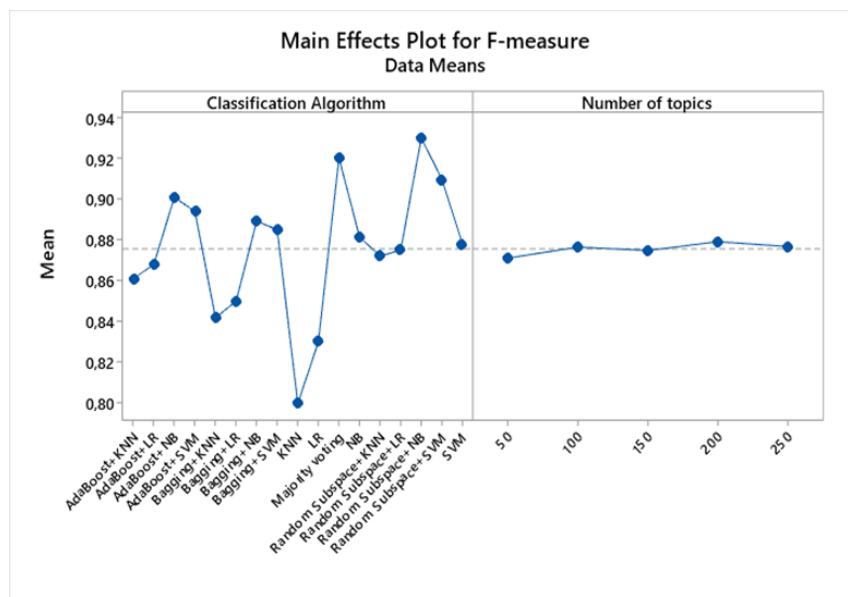


Fig. 4. The main effects plot for F-measure values

5. CONCLUSION

Due to advancements in information technology, significant text documents on a variety of subjects, including socioeconomic and epidemiological issues, are shared on the Web. Additionally, text-based posts such as news articles, disease reports, and news bulletins shared on various Internet platforms provide critical information for the early detection of emerging infectious disease outbreaks. Additionally, this data is necessary for the development of web-based bio surveillance systems. The increasing number of news articles published on the web complicates the use of these sources for forecasting disease, epidemics, and socioeconomic factors. Thus, text mining and machine learning-based systems that efficiently and accurately assign news texts to relevant topics are required to develop an effective web-based bio surveillance system. Documents are represented in topic modeling as a mixture of topics, while topics are represented as a probability distribution over words and topics as a probability distribution over topics. In this study, the predictive performance of topic modeling models was evaluated when combined with conventional classification algorithms and ensemble learning algorithms for identifying socioeconomic and epidemiological aspects in text documents. The empirical results indicate that combining topic modeling and ensemble classifiers can produce promising results for identifying socioeconomic and epidemiological issues in text documents.

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On the Performance of Classifiers and Feature Sets for Identification of Offensive and Hateful Language on Social Media

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Abstract

With the proliferation of the Internet and mobile devices, accessing social media platforms has become simpler, but in turn, this provides an easy pathway for the transfer of ideas, opinions, and feelings. However, as social media platforms are open to misuse and offensive and hateful language, these are common occurrences. An unchecked rise in hatred poses a great threat to our society, as well as a significant threat to groups and individuals who are marginalized. Prevalent in social media is the practice of reviewing the content of a page both manually and through an algorithm to screen out offensive language and content. As the number of people and posts for social media platforms increase, the manual method is likely to become progressively inefficient. This means that in natural language processing, we must always be on the lookout for offensive and hateful language. We have studied the predictive capabilities of conventional text representation schemes and supervised learning algorithms. The basic word-based n-gram models (i.e., 1-gram, 2-gram, and 3-gram), character-based n-grams (i.e., 1-gram, and 2-gram), word/part-of-speech tag pairs, part-of-speech n-gram models (i.e., POS 2-gram, and POS 2-gram) and their ensemble combinations have been considered. To evaluate the predictive performance of feature sets on the task, we have utilized Naïve Bayes, logistic regression, support vector machines, C4.5 decision tree algorithm, k-nearest neighbor algorithm and random forest algorithm.

Keywords: text mining, ensemble learning, topic modelling, latent Dirichlet allocation, news classification

1. INTRODUCTION

Advances in IT technology as well as the proliferation and ubiquity of mobile Internet access devices have considerably enhanced access to platforms in social media. As a result, the number of users in social media and their content, such as feelings, thoughts, and opinions, continues to grow on social media platforms. However, easy access to social media platforms can also lead to abuse as it allows hateful or harassing content to be spread quickly. Online social media platforms make expressing oneself easy and globally, whether it is through normal online talk or hate. Hatred speech is typically directed at an individual, a group, or an organization, and includes insulting statements aimed at instigating hatred or damaging his/her reputation [1]. The automatic detection of hatred and offensive expressions in natural languages which are quite peculiar in their nature and often difficult to detect are a key component of today's online social platforms [2]. There are several important reasons why hateful/offensive speech, particularly in social media, is not detected easily. Many expressions do not contain an offensive character, but in the context they are used, they may contain abusive or hateful connotations [3]. Words can also be used to circumvent automatic content checks in a different way [4].

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Some platforms such as Twitter and Facebook, which are widely used social media platforms, use human work to eliminate malicious, abusive, offensive, or hateful content [1]. However, it is extremely difficult to remove irrelevant contents manually, given the volume of the contents shared on these platforms. This emphasizes that hate speech, harassment, malicious or offensive content should be automatically detected in the contents shared on social media platforms.

We have studied the predictive capabilities of conventional text representation schemes and supervised learning algorithms. The basic word-based n-gram models (i.e., 1-gram, 2-gram, and 3-gram), character-based n-grams (i.e., 1-gram, and 2-gram), word/part-of-speech tag pairs, part-of-speech n-gram models (i.e., POS 2-gram, and POS 2-gram) and their ensemble combinations have been considered. To evaluate the predictive performance of feature sets on the task, we have utilized Naïve Bayes, logistic regression, support vector machines, C4.5 decision tree algorithm, k-nearest neighbor algorithm and random forest algorithm.

This article consists of five parts. In the second section, we discuss previous work on the identification of offensive and hateful words. Section 3 provides details on the study methods such as the dataset, text representation models and supervised learning algorithms. Section 4 contains the details and the empirical results of the experiment. In Section 5, the conclusion is presented.

2. RELATED WORK

Due to the various tasks it may be used, much attention was paid to the detection of hate speech. Most of the previous research contributions used both supervised techniques and linguistic features.

For instance, Davidson et al. [5] reviewed conventional text representation systems' predictive performance as well as supervised learning techniques for automated hate speech identification. The empirical results have shown that weighted n-gram models by TF-IDF together with the linear regression algorithm can deliver promising results for the recognition of hate speech. In another study, Sharma et al [6] developed and annotated Twitter data using an ontological classification scheme for the identification of harmful speech based on the level of hateful intention. The predictive performance of demographic, lexical and geographical features in hate speech recognition was investigated by Waseem and Hovy [7] in another study. Empirical results showed that geographical features and features based on word length do not improve predictive performance of supervised learning algorithms. Gender information, however, can be used together with n-grams as an effective feature for recognizing hate speech. Likewise, Nobata et al. [4] have used n-gram features, linguistic characteristics, syntactic features and distributed semantic features in online content for abusive language identification.

Agarwal and Sureka [8] carried out another study using topic modelling, sentiment analyses and semantic tagging for the identification by their narrative intent of racist and radicalized Tumblr posts. In this scheme, for subject classification and intent classification tasks a cascaded ensemble classification model was presented. Alfina et al.[9] built a new dataset for several aspects of the speech of hate, including religion, race, ethnicity and sex. The predictive performance of traditional language features, such as word bigram, word unigram, character trigram, four-gram character and negative feeling aspects, have been considered. Empirically, supervised learning algorithms like, Naïve Bayes, support vector machines, Bayesian logistic regression, and random forest algorithms were evaluated. The predictive performance of word n-gram features, n-gram characteristics, syntactical characteristics, and negative sentiment-based features for the determination of the offensive and hate speech in South African tweets have been recently assessed by Oriola and Kotze [10].

Deep neural networks are used also on social media platforms to detect offensive or hateful speech. Badjatiya et al. [11], for example, have presented a deep learning approach to the identification of hateful speech. Predictive performance was evaluated in conjunction with two deep-neural network architectures, namely neural neural networks, and a long-term memory architecture, for three neural language models (i.e. random embedding, fastText, and GloVe). In another paper, Kapil et al. [12] examined schemes and neural language models to identify hate speech in conventional neural representation systems. Word2vec, GloVe, quickText and one-hot encoding are considered in this scheme. 13 different deep neural architectures were analyzed based on convolutional neural networks, long-term memory, bidirectional long-term memory, and character-convolutional neural networks. The analysis showed that a bidirectional short-term and character-convolutional neural network with GloVe word embedding system delivers promising results for the task of hate speech recognition.

Similarly, a new hybrid neural network architecture based on a convolutional neural network, a gated recurrent unit and multi-task learning has been presented for hate speech detection [13]. Similarly, Lee and Lee [14] presented

a deep learning scheme for the identification of bias and hate speech. This scheme presents multi-channel convolutional neural network architecture with an attention mechanism. A deep learning-based system for offensive language identification has recently been put forward by Zhao and Tao [15]. XML-RoBERTa has been used for this system.

Identifying offensive and hateful social media speech can be modelled as a text classification task. A critical subfield of text mining is the classification of texts into a defined category or class. The classification of webpages [16], the sentiment analysis [17-22] and the classification of text genres [23] all have been application fields of text mining. To identify hateful speech, it is essential to use a text representation scheme with a supervised learning algorithm. In this respect, these experiments will assess the utility of conventional text representation schemes and supervised learning algorithms.

3. METHODOLOGY

This section presents the dataset utilized in the empirical analysis, the text representation models and supervised machine learning classifiers.

3.1. Dataset

The empirical analysis made use of the hate speech lexicon obtained from hatebase.org [5]. The text documents in this dataset have been annotated as hate speech using user-supplied words and phrases. The dataset was retrieved using the Twitter API. After pre-processing, the dataset was populated with a randomly sampled collection of 25,000 tweets. The label “hate” is applied to tweets that contain hateful text, the label “offensive” is applied to tweets that contain only offensive text, and tweets that do not contain hateful or offensive text are annotated as “okay” in the dataset.

3.2. Conventional text representation models

Three basic word-based n-gram models (namely, 1-gram, 2-gram, and 3-gram) are used to represent text documents, as well as part-of-speech 2-gram and 3-gram features, word/part-of-speech tag pairs, character n-gram (n=2) and character n-gram (n=3) features, and the effectiveness of the ensemble feature sets obtained by combining these features. The rest of this section briefly explains these models.

The n-gram text representation method is one of the most frequently used representation techniques for text documents. An n-gram is a contiguous array of any text document’s n elements. n-grams constructed from words and characters are widely used in text mining and natural language processing [24]. A unigram feature representation represents the presence or absence of a given word in a text document. To model the presence of consecutive words, the bigram (2-gram) representation is used. Similarly, the trigram (3-gram) feature representation is used to represent the presence of three consecutive words in a body of text. In addition to word-based n-gram models, character-based n-gram models can be used to model the presence of character n-grams.

Part-of-speech (POS) tagging is a natural language processing application used in text mining studies to assign words in a text to a specific sentence element based on their definition and context. Part-of-speech tagging is widely used in natural language processing to create an efficient classification model.

In some cases, the meanings of words may vary according to the type of sentence in which they are used. To model this situation, the word/POS pairs feature extracts a separate feature for each distinct word and part-of-speech in the text document.

3.3. Supervised learning algorithms

Six basic machine learning classifiers are used for experimental analysis: Naive Bayes algorithm, logistic regression algorithms, C4.5 decision tree, k-nearest neighbor algorithm, and random forest algorithm.

Naïve Bayes algorithm (NB) is a simple supervised learning algorithm based on the Bayes theorem. In this scheme, the features of the learning problem have been assumed to be independent while modelling the learning task. Assuming that features are independent in determining the class label, the algorithm has a very scalable structure that needs only few parameters. In many text classification tasks, the NB algorithm is successful,

particularly for e-mail spam filtering. The algorithm can achieve competitive performances with more complex classification algorithms [16].

The logistic regression (LR) algorithm is a basic supervised learning algorithm that uses a linear function predictive variables to model the probability of any event occurring [25]. In the logistic regression algorithm, the probability value used in determining the class labels is calculated based on the linear function directly on the parameters. In natural language processing and text mining applications, it is seen that the logistic regression algorithm has many design advantages in common with the NB algorithm, is scalable and gives very effective results in terms of correct classification performance.

Support vector machines algorithm (SVM) is among the basic learning algorithms that can be applied in classification and regression problems. SVM can be used for both linear and nonlinear classification problems. Here, the classification process is created by partitioning the data set to form a high-dimensional hyperplane [26].

Decision tree algorithms are non-parametric guided algorithms for classification and regression problems that can successfully be used. The main goal is to get a learning model which forecasts the value of the goal variable by learning the fundamental decision rules derived from the data set features. Decision tree algorithms attempt to build a learning model by modifying an attribute's importance in its context. Learning models and rules derived from algorithms of decision tree enable the decisions about classification processes to be easily understood and interpreted. C4.5 decision tree algorithm is the successor to ID3 and removes the restriction that features must be categorical by dynamically defining a discrete feature [27].

K-nearest neighbor algorithm (KNN) is an instance-based classification algorithm. In this algorithm, the k-nearest neighbor will first be determined based on any distance/closeness criteria. Based on the nearest neighbors, the class label for the instance to be classified is determined by taking the majority votes of the neighbors' class labels.

The Random Forest algorithm (RF) is a meta-prediction that uses a set of decision tree classification algorithms to check the accuracy and overfitting of various sub-samples of the dataset. The parameter bootstrap [28] controls the size of the subsample.

4. EXPERIMENTAL PROCEDURE AND RESULTS

The Python language and the scikit-learn library were used to implement the basic learning algorithms and text representation methods used in the experimental analyses. In the experimental analysis, the learning algorithms were evaluated using 10-fold cross validation based on classification accuracy, precision, recall, and F-measure. Classification accuracy (ACC) is defined as the proportion of true positives and negatives obtained by the classification algorithm as a percentage of the total number of instances, as defined by Equation 1:

$$ACC = \frac{TN + TP}{TP + FP + FN + TN} \tag{1}$$

where *TN* denotes number of true negatives, *TP* denotes number of true positives, *FP* denotes number of false positives and *FN* denotes number of false negatives.

Precision (PRE) is the ratio of true positives to false positives, as defined by Equation 2:

$$PRE = \frac{TP}{TP + FP} \tag{2}$$

Recall (REC) is the ratio of true positives to false positives, as defined by Equation 3:

$$PRE = \frac{TP}{TP + FP} \tag{3}$$

F-measure takes values between 0 and 1. It is the harmonic mean of precision and recall as determined by Equation 4:

$$F - measure = \frac{2 * PRE * REC}{PRE + REC} \tag{4}$$

In Tables 1-4, classification accuracy, precision, recall, and F-measure values obtained by the text representation models have been presented. Regarding the predictive performance of supervised learning algorithms taken into consideration in the empirical analysis, the highest predictive performance has been achieved by the random forest algorithm and the second highest predictive performance has been achieved by Naïve Bayes algorithm. The third highest predictive performance has been achieved by support vector machines algorithm. The lowest predictive performances in terms of evaluated metrics have been obtained by the k-nearest algorithm. The second concern of the empirical analysis is to evaluate the predictive performance of text representation models. The empirical results indicate that word-based trigram features outperform word-based unigram and word-based bigram features. POS trigram features yield higher predictive performances compared to POS bigram features. The ensemble feature set which combines unigram, bigram and trigram features outperform word-based unigram, word-based bigram, word-based trigram models. Character n-gram models outperform word-based n-gram models. Regarding the predictive performances of ensemble feature sets, the highest predictive performances have been generally obtained by the ensemble feature set which combines trigram features with character n-grams (for n=2). The highest predictive performance among all the compared schemes has been achieved by the ensemble feature set which combines trigram features with character n-grams (for n=2) in conjunction with the random forest algorithm, with a classification accuracy of 85.66.

Table 1. Classification accuracy values obtained by text representation models

Text Representation Model	NB	LR	SVM	C4.5	KNN	RF
Unigram	81.32	72.24	79.75	77.93	76.73	82.95
Bigram	81.36	73.22	79.84	78.01	76.78	82.97
Trigram	81.36	73.83	79.92	78.01	76.83	83.13
POS Bigrams	81.39	74.03	79.99	78.18	76.94	83.21
POS Trigrams	81.43	74.21	80.01	78.19	77.25	83.93
Word/POS Pairs	81.49	74.32	80.15	78.27	77.34	84.09
Unigram+Bigram+Trigram	81.49	74.38	80.16	78.31	77.37	84.13
POS Bigram+POS Trigram	81.49	74.45	80.36	78.48	77.44	84.14
All features above	81.60	74.77	80.39	78.70	77.49	84.24
Character N-grams (N=2)	81.76	74.78	80.40	78.70	77.49	84.37
Character N-grams (N=3)	81.78	74.92	80.49	78.95	77.52	84.75
Unigram+Character N-grams (2)	82.26	76.03	80.99	79.22	77.88	85.31
Bigram+Charactr N-grams (2)	82.63	76.41	81.14	79.27	77.89	85.47
Trigram+ Character N-grams (2)	82.72	76.46	81.17	79.44	77.91	85.66
Unigram+Character N-grams (3)	81.96	75.21	80.51	78.99	77.62	84.98
Bigram+Charactr N-grams (3)	81.98	75.44	80.63	79.00	77.70	84.98
Trigram+ Character N-grams (3)	82.10	75.88	80.86	79.18	77.77	85.26

Table 2. Precision values obtained by text representation models

Text Representation Model	NB	LR	SVM	C4.5	KNN	RF
Unigram	0.82	0.73	0.80	0.79	0.77	0.84
Bigram	0.82	0.74	0.80	0.79	0.77	0.84
Trigram	0.82	0.74	0.81	0.79	0.77	0.84

POS Bigrams	0.82	0.75	0.81	0.79	0.78	0.84
POS Trigrams	0.82	0.75	0.81	0.79	0.78	0.85
Word/POS Pairs	0.82	0.75	0.81	0.79	0.78	0.85
Unigram+Bigram+Trigram	0.82	0.75	0.81	0.79	0.78	0.85
POS Bigram+POS Trigram	0.82	0.75	0.81	0.79	0.78	0.85
All features above	0.82	0.75	0.81	0.79	0.78	0.85
Character N-grams (N=2)	0.82	0.75	0.81	0.79	0.78	0.85
Character N-grams (N=3)	0.82	0.75	0.81	0.80	0.78	0.85
Unigram+Character N-grams (2)	0.83	0.77	0.82	0.80	0.78	0.86
Bigram+Charactr N-grams (2)	0.83	0.77	0.82	0.80	0.78	0.86
Trigram+ Character N-grams (2)	0.83	0.77	0.82	0.80	0.78	0.86
Unigram+Character N-grams (3)	0.83	0.76	0.81	0.80	0.78	0.86
Bigram+Charactr N-grams (3)	0.83	0.76	0.81	0.80	0.78	0.86
Trigram+ Character N-grams (3)	0.83	0.76	0.81	0.80	0.78	0.86

Table 3. Recall values obtained by text representation models

Text Representation Model	NB	LR	SVM	C4.5	KNN	RF
Unigram	0.82	0.73	0.80	0.78	0.77	0.84
Bigram	0.82	0.74	0.80	0.79	0.77	0.84
Trigram	0.82	0.74	0.80	0.79	0.77	0.84
POS Bigrams	0.82	0.75	0.81	0.79	0.77	0.84
POS Trigrams	0.82	0.75	0.81	0.79	0.78	0.85
Word/POS Pairs	0.82	0.75	0.81	0.79	0.78	0.85
Unigram+Bigram+Trigram	0.82	0.75	0.81	0.79	0.78	0.85
POS Bigram+POS Trigram	0.82	0.75	0.81	0.79	0.78	0.85
All features above	0.82	0.75	0.81	0.79	0.78	0.85
Character N-grams (N=2)	0.82	0.75	0.81	0.79	0.78	0.85
Character N-grams (N=3)	0.82	0.75	0.81	0.80	0.78	0.85
Unigram+Character N-grams (2)	0.83	0.77	0.82	0.80	0.78	0.86
Bigram+Charactr N-grams (2)	0.83	0.77	0.82	0.80	0.78	0.86
Trigram+ Character N-grams (2)	0.83	0.77	0.82	0.80	0.78	0.86
Unigram+Character N-grams (3)	0.83	0.76	0.81	0.80	0.78	0.86
Bigram+Charactr N-grams (3)	0.83	0.76	0.81	0.80	0.78	0.86
Trigram+ Character N-grams (3)	0.83	0.76	0.81	0.80	0.78	0.86

Table 4. F-measure values obtained by text representation models

Text Representation Model	NB	LR	SVM	C4.5	KNN	RF
Unigram	0.82	0.73	0.80	0.78	0.77	0.84
Bigram	0.82	0.74	0.80	0.79	0.77	0.84
Trigram	0.82	0.74	0.80	0.79	0.77	0.84
POS Bigrams	0.82	0.75	0.81	0.79	0.77	0.84
POS Trigrams	0.82	0.75	0.81	0.79	0.78	0.85
Word/POS Pairs	0.82	0.75	0.81	0.79	0.78	0.85
Unigram+Bigram+Trigram	0.82	0.75	0.81	0.79	0.78	0.85
POS Bigram+POS Trigram	0.82	0.75	0.81	0.79	0.78	0.85
All features above	0.82	0.75	0.81	0.79	0.78	0.85
Character N-grams (N=2)	0.82	0.75	0.81	0.79	0.78	0.85
Character N-grams (N=3)	0.82	0.75	0.81	0.80	0.78	0.85
Unigram+Character N-grams (2)	0.83	0.77	0.82	0.80	0.78	0.86
Bigram+Character N-grams (2)	0.83	0.77	0.82	0.80	0.78	0.86
Trigram+ Character N-grams (2)	0.83	0.77	0.82	0.80	0.78	0.86
Unigram+Character N-grams (3)	0.83	0.76	0.81	0.80	0.78	0.86
Bigram+Character N-grams (3)	0.83	0.76	0.81	0.80	0.78	0.86
Trigram+ Character N-grams (3)	0.83	0.76	0.81	0.80	0.78	0.86

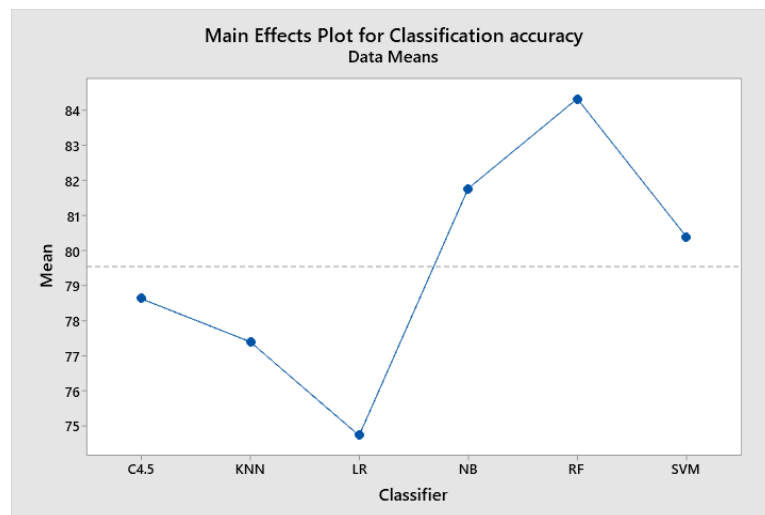


Fig. 1. The main effects plot for accuracy values based on classification models

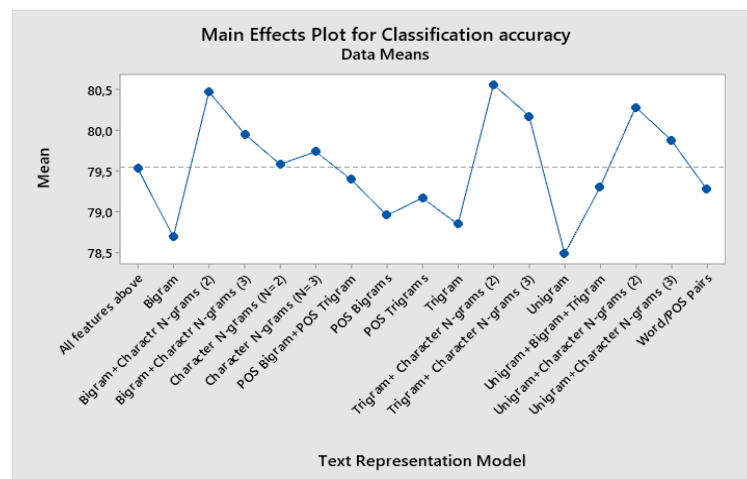


Fig. 2. The main effects plot for accuracy values based on text representation models

To summarize the main findings of the empirical analysis, Figure 1 summarizes the empirical results regarding the classification algorithms in terms of accuracy and Figure 2 summarizes the empirical results regarding the text representation models in terms of accuracy values.

5. CONCLUSION

With the increased proliferation of the Internet and mobile devices, social media has become simpler to access, but in turn, this makes it an easy way to spread ideas, opinions, and feelings. However, as social media platforms are open to misuse and the use of hateful or inappropriate language, these occurrences are not at all uncommon. There is a great threat to our society if we do not check the growth of hatred, and a significant threat to groups and individuals who are marginalized. With social media such as Facebook, Twitter, and Instagram, reviewers can perform a variety of checks, including manual reviews and automatic scans, to identify and screen out offensive content. Increasing the number of people and posts on social media platforms necessitates an increase in the amount of effort required to do it manually. This means that in natural language processing, we must always be on the lookout for offensive and hateful language. We have studied the predictive capabilities of conventional text representation schemes and supervised learning algorithms. We have researched the capability of conventional text representation schemes and supervised learning algorithms. We have studied the predictive capabilities of conventional text representation schemes and supervised learning algorithms. The basic word-based n-gram models (i.e., 1-gram, 2-gram, and 3-gram), character-based n-grams (i.e., 1-gram, and 2-gram), word/part-of-speech tag pairs, part-of-speech n-gram models (i.e., POS 2-gram, and POS 2-gram) and their ensemble combinations have been considered. To evaluate the predictive performance of feature sets on the task, we have utilized Naïve Bayes, logistic regression, support vector machines, C4.5 decision tree algorithm, k-nearest neighbor algorithm and random forest algorithm.

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Prioritization of Strategic Goals for Smart City Governance with Fuzzy MCDM Techniques

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Abstract

The majority of the population in the world and our country live in cities. Rural to urban migration rates are increasing rapidly with expectations such as a better quality of life, better education, easier access to health services, and more job opportunities. While trying to provide quality and sustainable service to the increasing population with limited natural resources in the regions receiving migration, a qualified workforce is tried to be protected in migrant regions. Reducing these negativities is closely related to the more efficient, innovative, and rational management of existing systems in cities. In this context, there are rational solutions to urban problems with the "smart city" approach. At this point, it is necessary to create long-term action plans and determine strategic goals for smart cities. Prioritizing strategic goals for smart city governance with numerous components is viewed as a multi-criteria decision-making (MCDM) problem in this study. Fuzzy logic is utilized to overcome the uncertainty in this MCDM problem. The study aims to prioritize the strategic goals for smart cities with fuzzy MCDM techniques. The weights of smart city components are computed with the fuzzy Simple Additive Weighting (SAW) technique. The strategic goals are evaluated using the fuzzy Evaluation based on Distance from Average Solution (EDAS) technique. An application is presented to demonstrate the power of the proposed methodology. Finally, the results are presented, and the concluding remarks and future perspectives are provided.

Keywords: EDAS, fuzzy logic, MCDM, SAW, smart cities

1. Introduction

The majority of the population in the world and our country live in cities. Rural to urban migration rates are increasing rapidly with expectations such as a better quality of life, better education, easier access to health services, and more job opportunities. The rapidly increasing population and migration from rural to urban are the basis of many problems faced by cities. Increasing immigration rates affect both sending and receiving cities. While trying to provide quality and sustainable service to the increasing population with limited natural resources in the regions receiving migration, a qualified workforce is tried to be protected in migrant regions. These emerging problems negatively affect the economic and social life in the cities and reduce the quality of life of the citizens and reduce the brand and competitiveness of the cities. Reducing these negativities is closely related to the more efficient, innovative, and rational management of existing systems in cities [1-3].

The smart city is rapidly being implemented in many cities around the world for rationally solving urban problems. With this approach, cities that invest in human and social capital, establish smart transportation and communication

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infrastructure, ensure sustainable and high quality of life, and manage natural resources with participatory governance are targeted [4,5].

In order to fulfill these goals, smart cities must be managed with the right strategic objectives to satisfy rising demand in a more effective, safe, and ecologically responsible manner. At this point, it is necessary to create long-term action plans and determine strategic goals for smart cities.

Prioritizing strategic goals for smart city governance with numerous components is viewed as a multi-criteria decision-making (MCDM) problem in this study. MCDM is a robust approach commonly used for analyzing problems with various, often contradictory criteria [6].

The smart city concept's composite structure includes a wide range of contradicting components. When information is uncertain, however, it is difficult to choose and rank alternatives. Decision-Makers (DMs) may have difficulty explaining their views in numbers [7]. Furthermore, DMs may express themselves more freely while using fuzzy numbers.

The aim of the study is to prioritize the strategic goals for smart cities with fuzzy MCDM techniques. The evaluation model is structured by analyzing the industry reports, research papers and consulting the experts. The weights of smart city components are computed with the fuzzy Simple Additive Weighting (SAW) technique. The strategic goals are evaluated using the fuzzy Evaluation based on Distance from Average Solution (EDAS) technique.

The paper's structure is as follows: The smart city concept is summarized in the next section. Section 3 presents the research methodology. The implementation of the research methodology is given in section 4, and lastly, section 5 presents the final remarks of the study.

2. Smart City Concept

The need for cities to compete in a globally interconnected economy and sustain their inhabitants' well-being is driving cities to consider new technology and innovative approaches. The complexity and speed of change brought about by technology and innovative approaches challenge ecosystem stakeholders and reveal the need for a holistic and systematic approach to city solutions. In meeting this need, the Smart City approach, which ensures that interoperable systems meet future predictions, expectations, and problems based on data, is the solution [8,9].

The aims of smart cities are [9-11]:

- to transform the city's current and future demands and difficulties into a triggering force throughout all of the city's places and systems,
- to be able to deal with social, physical, and digital planning together,
- to estimate, detect and solve emerging challenges in a systematic, agile and sustainable manner,
- to demonstrate the potential of integrated service delivery and innovation by providing interaction between organizational structures in the city.

The stakeholders in the smart city ecosystem show a wide range of distribution. Stakeholders include residents of the city, local governments, central government institutions and organizations, non-governmental organizations, the private sector, and universities [9,12]. Smart cities will be sustainable with effective management of resources and services based on coordination and interoperability between stakeholders. In this concept, strategic goals need to be determined in order to ensure agile and organic cooperation and coordination between smart city stakeholders [12,13].

In order to create smart cities, implement them effectively and efficiently, and ensure their sustainability, governance mechanisms with the active participation of all ecosystem stakeholders will be established, and coordination between existing and newly created mechanisms will be ensured. As a result of the smart city policies implemented with the smart city ecosystem and governance mechanism, it is expected that the problems and needs in the cities will be foreseen and solutions will be produced, better quality and faster delivery of urban services, an increase in satisfaction with their services and an increase in the quality of life [3,9].

Very few studies in the literature support the smart city concept with the MCDM approach and analytical techniques. There are studies on the evaluation of the logistics solutions of smart cities [14], the ranking of smart cities in terms of energy [15], the control of air pollution in cities [16], their integration with digital technologies [17,18], and transportation infrastructure [19]. No study in the literature handles smart cities with strategic goals and evaluates these objectives with analytical techniques. In this study, this gap in the literature is filled.

3. Research Methodology

In this study, the proposed methodology involves three steps:

Step 1. Identification of the evaluation model and strategic goals for smart city governance with the help of industry reports and experts.

Step 2. Identification of the smart city component weights with the fuzzy SAW technique.

Step 3. Evaluation of strategic goals for smart city governance and prioritization of these goals with fuzzy EDAS.

Fig. 1 illustrates this research methodology.

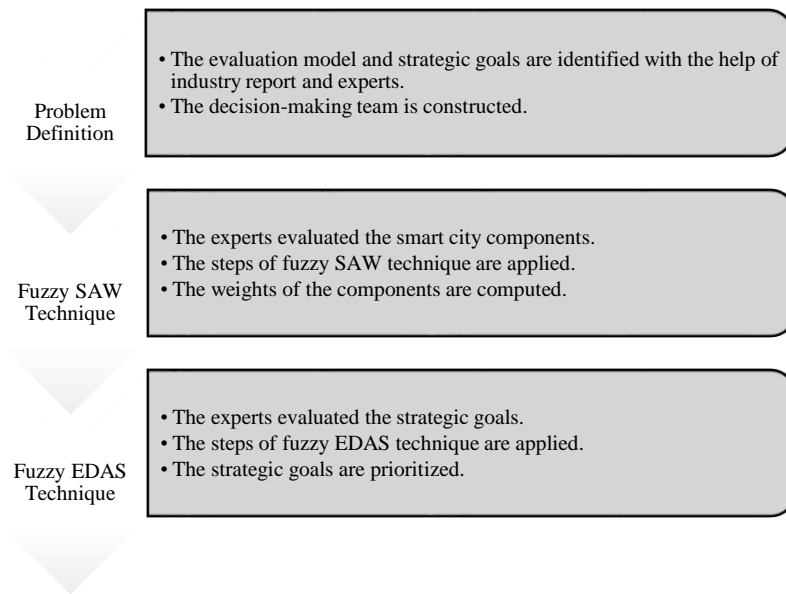


Fig. 1. The stages of the research methodology.

3.1. Evaluation model and strategic goals for smart city governance

The evaluation model for smart city governance is shown in Table 1. In this model, there are sixteen components.

Table 1. Evaluation model [9]

Smart City Components	Explanation
Smart environment (C1)	It is to ensure the sustainability of the environment and nature by protecting the city's natural assets with the management of waste, air, water, soil, combating climate change with the support of Information and Communication Technologies.
Smart security (C2)	Using technology is to protect citizens and provide crisis management against threats that may arise against the current security situation in cities.
Smart person (C3)	She/He is an individual with high awareness, participation, and creativity, a lifelong learner, incorporating information technologies into her life, the main element of human and social capital and the focal point of city life.
Smart building (C4)	It includes systems that aim to increase the quality of life by touching basic needs such as housing quality, housing quality, building security measures, building air conditioning, and energy systems with a rational and technological approach.
Smart economy (C5)	It handles the micro and macro dimensions of a city's economic inputs, outputs, and activities within the framework of smart industries.
Smart space management (C6)	It means that cities can be resilient against natural disasters socially, culturally, and economically livable and sustainable.
Smart health (C7)	These services aim to increase the quality of life, improve health services, increase the awareness of individuals about their health, and enable an intelligent analysis of health data.

Smart governance (C8)	It expresses governance that enables faster, more accurate, and effective decision-making with the principles of transparency, participation, and accountability in public administration processes such as analysis, planning, implementation, and policymaking.
Information technologies (C9)	It ensures that producing, collecting, processing, operating, and sharing information are carried out with technology support.
Smart transportation (C10)	It is a technology-supported and integrated transportation system. It encompasses sustainable, safe, and interconnected transport systems, including tram, bus, train, metro, car, sea and air transport, bicycle, and pedestrian, where one or more modes of transport are used.
Smart energy (C11)	It is the management of energy with highly efficient networks in terms of energy and resources, supported by renewable energy sources, providing cost and energy savings and innovative approaches.
Communication technologies (C12)	It is the whole of infrastructure, technology, standards, and equipment related to the transfer of information.
Information security (C13)	It is the preservation of information by applying a risk management process in line with the elements of confidentiality, integrity, and accessibility.
Smart infrastructure (C14)	These are systems that transmit, analyze, measure, monitor the data collected with sensors used within the scope of smart environment, smart transportation and communication technologies components, and respond intelligently to user demands and changes in the environment for improved performance and user experience.
Disaster and emergency management (C15)	It is a set of systems that reduce the damages that may be encountered by taking precautions, ensure preparation for disasters and emergencies, intervene when a situation occurs, and analyze disaster and emergency data intelligently.
Geographic information systems (C16)	It is the hardware, software, human resources, standards, and methods necessary for the production, supply, storage, processing, management, analysis, sharing, visualization, presentation, and keeping up-to-date geographic data.

In this paper, there are four strategic goals from Smart City Action Plan [9]. These strategic goals are as follows:

- *Strategic goal 1 (STR1)*: Building an efficient smart city ecosystem
- *Strategic goal 2 (STR2)*: Increasing smart city transformation capacity
- *Strategic goal 3 (STR3)*: Creating a suitable and supportive environment in smart city transformation
- *Strategic goal 4 (STR4)*: Ensuring smart city transformation in urban services

3.2. Fuzzy SAW technique

The most extensively utilized MCDM technique is the SAW, also known as the weighted sum technique [20]. The central concept of SAW is to compute a weighted total of each alternative's performance ratings. Each choice receives an evaluation score. The benefit of this technique is that raw data is transformed in a proportionate linear manner, which implies that the relative order of the sizes in the standardized points stays the same [21].

Chou et al. [22] introduced the fuzzy SAW technique to solve problems under a fuzzy environment. The steps of the fuzzy SAW technique are as follows:

Linguistic term	Abb.	Fuzzy Numbers
None	N	(0,0,0.17)
Very Low	VL	(0,0.17,0.33)
Low	L	(0.17,0.33,0.5)
Medium	M	(0.33,0.5,0.67)
High	H	(0.5,0.67,0.83)
Very High	VH	(0.67,0.83,1)
Perfect	P	(0.83,1,1)

Step 1. DMs evaluate criteria using linguistic terms in Table 2.

Table 2. Linguistic scale for fuzzy SAW [23]

Step 2. Let $Dt = \{d_1, d_2, \dots, d_k\}$ be a committee of k DMs, $Ai = \{a_1, a_2, \dots, a_I\}$ be a discrete set with I member alternatives, $Cj = \{c_1, c_2, \dots, c_J\}$ be a set consisting of the decision criteria, be the degree of importance of each DM,

where $0 \leq I_t \leq 1, t = 1, 2, \dots, k$, and $\sum_{t=1}^k I_t = 1, \tilde{w}_t$ be the fuzzy weight of the DMs. The degree of importance I_t is computed as:

$$I_t = \frac{d(\tilde{w}_t)}{\sum_{t=1}^k d(\tilde{w}_t)}, t = 1, 2, \dots, k \tag{1}$$

where $d(\tilde{w}_t)$ yields the fuzzy weight's defuzzified value using the signed distance.

Step 3. Aggregated fuzzy weights of individual attributes (\tilde{W}_j) are computed. The aggregated fuzzy attribute weight, $\tilde{W}_j = (a_j, b_j, c_j)$ of criterion C_j assessed by the committee of k DMs is computed as:

$$\tilde{W}_j = (I_1 \otimes \tilde{W}_{j1}) \oplus (I_2 \otimes \tilde{W}_{j2}) \oplus \dots \oplus (I_k \otimes \tilde{W}_{jk1}) \tag{2}$$

where $a_j = \sum_{t=1}^k I_t a_{jt}, b_j = \sum_{t=1}^k I_t b_{jt}, c_j = \sum_{t=1}^k I_t c_{jt}$.

Step 4. The fuzzy weights of criteria are defuzzified. The defuzzification of \tilde{W}_j is denoted as $d(\tilde{W}_j)$ and computed as:

$$d(\tilde{W}_j) = \frac{1}{3} (a_j + b_j + c_j), j = 1, 2, \dots, n \tag{3}$$

Step 5. Normalized weight of criterion C_j is denoted as W_j and computed as:

$$W_j = \frac{d(\tilde{W}_j)}{\sum_{j=1}^n d(\tilde{W}_j)}, j = 1, 2, \dots, n \tag{4}$$

where $\sum_{j=1}^n W_j = 1$ and the weight vector $W = (W_1, W_2, \dots, W_n)$ is constructed.

3.3. Fuzzy EDAS technique

Ghorabae et al. [24] introduced the EDAS technique and proved its validity. For the evaluation of alternatives, this technique examines the average answer. It is also an approach based on distance. Ghorabae et al. [25] offer the EDAS technique with fuzzy logic for supplier selection in the literature. In addition, the EDAS approach was integrated with advanced methodologies from the literature.

The following are the steps of the fuzzy EDAS technique [25]:

Step 1: A fuzzy scale in Table 3 is used to generate the matrix between components and strategic goals.

Table 3. Linguistic scale for fuzzy EDAS [25]

Linguistic expression	Abb.	Fuzzy Scale
Very Good	VG	(8, 9, 10)
Good	G	(6, 7, 8)
Fair	F	(4, 5, 6)
Poor	P	(2, 3, 4)
Very Poor	VP	(1, 1, 2)

Step 2: Positive and negative distance from average (PDA-NDA) matrices are computed. The set of beneficial criteria is denoted by B , whereas the set of non-beneficial criteria is denoted by N .

$$\tilde{pda}_{ij} = \begin{cases} \frac{\psi(\tilde{x}_{ij} \ominus \tilde{av}_j)}{\kappa(\tilde{av}_j)} & \text{if } j \in B \\ \frac{\psi(\tilde{av}_j \ominus \tilde{x}_{ij})}{\kappa(\tilde{av}_j)} & \text{if } j \in N \end{cases} \tag{5}$$

$$\tilde{nda}_{ij} = \begin{cases} \frac{\psi(\tilde{av}_j \ominus \tilde{x}_{ij})}{\kappa(\tilde{av}_j)} & \text{if } j \in B \\ \frac{\psi(\tilde{x}_{ij} \ominus \tilde{av}_j)}{\kappa(\tilde{av}_j)} & \text{if } j \in N \end{cases} \tag{6}$$

where $\bar{a}v_j$ denotes the average solutions matrix and $\kappa(\bar{a}v_j)$ is the defuzzified number.

Step 3: The weighted sum of positive and negative distances is computed.

$$\bar{s}p_i = \oplus_{j=1}^m (\bar{w}_j \otimes pda_{ij}) \tag{7}$$

$$\bar{s}n_i = \oplus_{j=1}^m (\bar{w}_j \otimes nda_{ij}) \tag{8}$$

Step 4: The values for all alternatives are normalized.

$$\bar{n}sp_i = \frac{\bar{s}p_i}{\max_i(\kappa(\bar{s}p_i))} \tag{9}$$

$$\bar{n}sn_i = 1 - \frac{\bar{s}n_i}{\max_i(\kappa(\bar{s}n_i))} \tag{10}$$

Step 5: The assessment score ($\bar{a}s_i$) for all alternatives is computed.

$$\bar{a}s_i = \frac{1}{2} (\bar{n}sp_i \oplus \bar{n}sn_i) \tag{11}$$

Step 6: The strategic goals are ranked based on their assessment values.

4. Implementation of the Research Methodology

4.1. Problem definition

The proposed methodology is implemented using an application to demonstrate its applicability. An institution prepares an action plan to implement the smart city approach and wants to prioritize the strategic goals within this action plan. There are four strategic goals. This institution must decide according to sixteen smart city components.

4.2. Identification of the component weight with fuzzy SAW technique

DMs evaluated smart city components using linguistic terms in Table 2 to compute their weights. These evaluations with linguistic expressions are illustrated in Table 4.

Table 4. DMs' evaluation of criteria

	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15	C16
DM1	H	VH	M	VL	M	VL	VH	M	VH	VH	H	VH	VH	M	M	VL
DM2	VH	H	L	L	H	L	VH	VH	P	H	H	VH	P	M	L	L
DM3	VH	H	L	VL	M	L	H	H	P	H	H	VH	H	L	VL	VL

The equations (1)–(4) are used to compute the weights of smart city components, as illustrated in Table 5.

Table 5. The weights of the smart city components

Criteria	Defuzzified Weights	Normalized Weights	Rank	Criteria	Defuzzified Weights	Normalized Weights	Rank
C1	0.778	0.083	4	C9	0.907	0.097	1
C2	0.722	0.077	6	C10	0.722	0.077	6
C3	0.389	0.042	12	C11	0.667	0.071	8
C4	0.222	0.024	15	C12	0.833	0.089	2
C5	0.556	0.060	10	C13	0.814	0.087	3
C6	0.278	0.030	14	C14	0.444	0.048	11

C7	0.778	0.083	4	C15	0.333	0.036	13
C8	0.667	0.071	8	C16	0.222	0.024	15

After the fuzzy SAW technique, according to Table 5, the most appropriate component is determined as Information Technologies (C9). The second one is Communication Technologies (C12). The third one is Information security (C13).

4.3. Prioritization of the strategic goals with the fuzzy EDAS technique

The matrix between components and strategic goals is constructed with the fuzzy scale's help in Table 3. Table 6 exhibits the DMs' assessments of the strategic goals.

Table 6. Evaluations for the strategic goals

	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15	C16
STR1	G	VG	F	P	F	VP	G	F	G	VG	G	G	G	F	P	VP
STR2	G	F	F	G	P	P	P	F	VG	F	F	VG	G	G	G	G
STR3	F	G	G	F	VP	F	G	F	G	P	P	G	G	P	G	F
STR4	F	F	G	F	F	F	F	F	G	G	P	G	G	F	F	G

The PDA and NDA matrices are built with (5) and (6) and \tilde{sp}_i and \tilde{sn}_i values are calculated using (7) and (8). \tilde{ns}_i , \tilde{ns}_i and \tilde{as}_i parameters are computed by using (9)-(11). The final ranking is displayed in Table 7.

Table 7. The final ranking

	NSP	NSN	AS	Defuzz. Value	Ranking
STR1	(0.827,0.988,1.185)	(0.384,0.425,0.522)	(0.605,0.707,0.854)	0.7220	1
STR2	(0.530,0.621,0.739)	(0.223,0.406,0.499)	(0.376,0.513,0.619)	0.5029	2
STR3	(0.282,0.337,0.398)	(-0.151,-0.012,0.163)	(0.065,0.163,0.280)	0.1695	4
STR4	(0.318,0.393,0.431)	(0.355,0.470,0.549)	(0.336,0.431,0.490)	0.4191	3

At the conclusion of the fuzzy EDAS technique, the most appropriate strategic goal is obtained as "Creating an effective smart city ecosystem (STR1)".

5. Conclusion

The purpose of this paper was to propose an evaluation model for smart cities and prioritize the strategic goals for smart city governance with fuzzy MCDM techniques. In this context, a smart city evaluation model was presented. Then, a research methodology for prioritizing strategic goals was provided. Firstly, the fuzzy SAW technique was used for the computation of the smart city component weights. Then, the fuzzy EDAS technique was used to prioritize strategic goals. To overcome uncertainty in the MCDM process, fuzzy logic was applied. The technique's usefulness was demonstrated by using an application, and the findings of this study are presented. The most appropriate strategic goal was found as "Creating an effective smart city ecosystem (STR1)".

One of the perspectives may be considering the dependence and the interaction between the criteria and extending our analysis by applying the analytic network process (ANP) approach. This MCDM problem can be solved using other fuzzy MCDM techniques to compare the other results with our result from the second perspective.

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Assessment of Logistics 4.0 Technologies with a Fuzzy MCDM Methodology

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Abstract

Nowadays, logistics processes are restructured with the technological innovations that trigger Industry 4.0. This development, defined as Logistics 4.0, involves several technologies such as wearable devices (e.g., smart glasses, smartwatch), big data, the internet of things, automation, and robotics. Accordingly, logistics companies need to assess these technologies to choose the most suitable one for their needs. This study aims to present a fuzzy multi-criteria decision-making (MCDM) methodology for technology assessment within the scope of Logistics 4.0. The criteria and alternatives are determined based on literature review and expert views. The fuzzy Analytic Hierarchy Process (AHP) method is used to weight the twelve criteria. The fuzzy Technique for Order Preference by Similarity to Ideal Solution (TOPSIS) method is applied to rank six Logistics 4.0 technologies. Finally, the methodology's usability is tested by applying the proposed method for a logistics company, and the outcomes of this study are provided.

Keywords: fuzzy sets, logistics 4.0, MCDM, technology assessment.

1. Introduction

To be successful in changing business conditions, it is essential adapting transformations with the help of technological advances. The notion of Industry 4.0 was first proposed at the Hannover Industry Fair in 2011, as the fourth industrial revolution founded on cyber-physical systems and internet of things technologies. The purpose of Industry 4.0 is providing communication between objects and people by making smart production thanks to these technologies and accelerating the decision-making process [1].

Industry 4.0 has shaped the forthcoming activities of logistics industry. The development of globalization, the growth of e-commerce, the technological disruption, and, most recently, the coronavirus epidemic have profoundly changed the ways of doing business in the 21st century. In this concept, Logistics 4.0 concept can be defined as the development of standardization and labour-saving with the progression of technology in logistics. Some of the technologies used in logistics replace processes that do not require human inclusion. The aim of Logistics 4.0 is to achieve the perfect balance between automation and mechanization [2]. Implementing the technology that will turn factories into "smart factories" is a strategic decision as it will be an essential investment. However, with the application of the right technology, this investment will return in terms of improving logistics cost performance and

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saving time. As a matter of fact, companies need to express precisely what they expect from these technologies in order to make the right decision. Therefore, this study aims to assess the advanced technologies available within the scope of Logistics 4.0 and present a scientific methodology that will help to rank these technologies.

In this study, a fuzzy Multi-Criteria Decision-Making (MCDM) methodology is implemented. MCDM is an extensively used technique for solving problems comprising multiple, frequently conflicting criteria. In MCDM literature, there are outranking methods, priority-based methods, distance-based methods, and mixed methods [3]. Fuzzy linguistic expressions are used in the study since the experts' statements are not precise. Experts can express themselves with the utilization of linguistic terms such as good, bad, very good. In this way, the proposed scientific method has been adapted to daily life. The criteria weights are computed with the fuzzy Analytic Hierarchy Process (AHP) method. The most appropriate Logistics 4.0 technology is determined with fuzzy Technique for Order Preference by Similarity to Ideal Solution (TOPSIS) method. The evaluation framework is determined with the help of a literature survey and expert views. An implementation for a logistics company is provided to demonstrate the effectiveness and practicality of the methodology. The findings of the study reveal the importance of some Logistics 4.0 technologies. This study can be regarded as a guide for companies trying to assess Logistics 4.0 technologies.

The study's plan is as follows; after the introduction in the first part, the existing studies on the subject are presented in the second part. In the third part, the research methodology is provided. Followingly, a numerical application is presented. At the end of the study, the concluding remarks and perspectives for future studies are given.

2. Studies about Logistics 4.0

Timm and Lorig [4] examined processes within the scope of Logistics 4.0 with two separate simulation approaches. Wang [5] examined the concept of Logistics 4.0 and the implementation of existing technologies in this context. Zheng and Ren [6] created a digital logistics equipment system and used AHP and Gray Correlation Degree. In another study, Büyüközkan et al. [7] studied the use of smart glasses technology in logistics and presented a method to help select the most suitable smart glasses.

Al et al. [8] studied the possible results of Industry 4.0 in Turkey and made an application for a company that has adopted the subject of Logistics 4.0. Wrobel-Lachowska et al. [9] analysed the role of education in Logistics 4.0. Schmidtke et al. [10] aimed to find the changes that Logistics 4.0 will create in the workforce by examining the technical potentials that Industry 4.0 will create in logistics.

Edirisuriya et al. (2018) conducted a systematic literature review for Logistics 4.0 and examined the use of lean and green concepts. Tijan et al. [11] comprehensively summarized the use of blockchain applications in logistics. Recently, Winkelhaus and Grosse [12] developed an inclusive literature review of the Logistics 4.0 concept, while Atzeni et al. [13] realized a bibliometric study on the use of collaborative robots in the environment of Logistics 4.0.

When we look at the papers in the literature, it is concluded that the interest in Industry 4.0 and Logistics 4.0 has been relatively high in recent years. The novelty of the subjects and the lack of studies about them arouses curiosity or academia and the sector.

3. Methodology

The methodology of the study contains three stages. In the first stage, the evaluation framework is developed with a literature survey, industrial reports, and experts. Fig. 1 illustrates the research methodology.

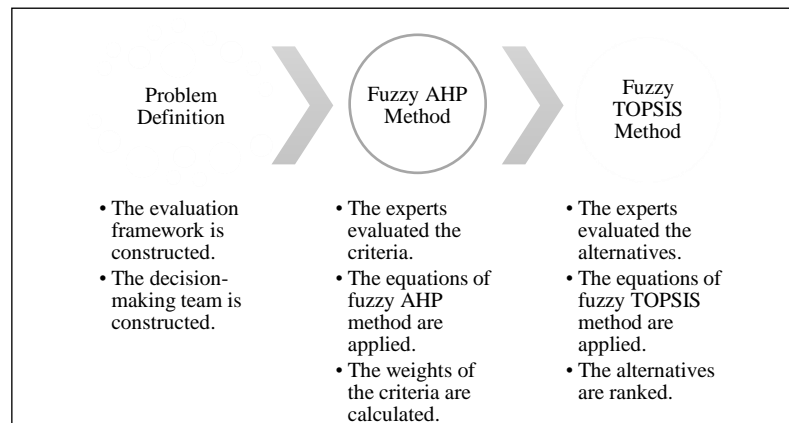


Fig. 1. The stages of the methodology.

The evaluation model consists of twelve criteria and six alternatives. Secondly, the experts evaluated these challenges, and the fuzzy AHP method computes the weights of criteria. Finally, experts evaluated logistics 4.0 technology alternatives, and the fuzzy TOPSIS method determines the most appropriate technology alternative.

3.1. Evaluation framework and alternatives

There will be a significant change in every sense for companies that decide to realize digital transformation in the coming years. Companies, the reasons behind this transformation; increasing competition conditions, customer needs, making more profit, etc. Most of the time, they do not clearly define what they expect from the transformation.

In this study, in order to understand exactly what companies expect from Logistics 4.0, a framework about companies' expectations was created by analyzing the studies and industry reports in the literature [5, 7, 14-15]. Afterward, these expectations were finalized by consulting the experts of the subject. In this framework, there are three main criteria: people, process, and technology. Furthermore, there exist twelve sub-criteria below these main criteria. Fig 2. illustrates the criteria structure of the study.

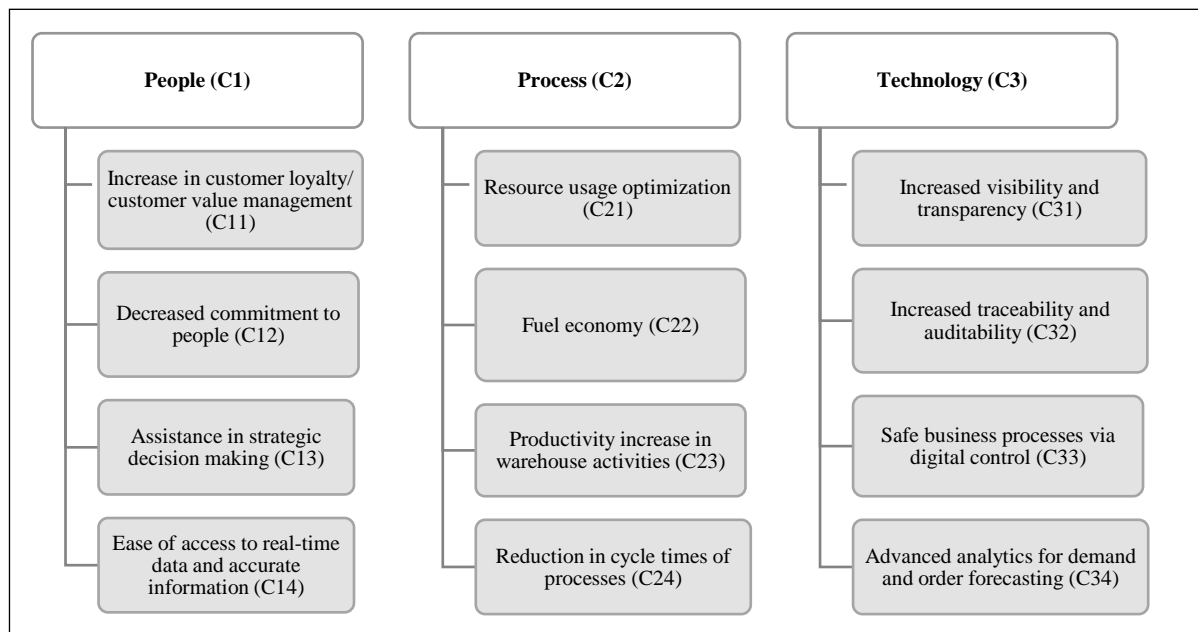


Fig. 2. Evaluation framework [5, 7, 14-15].

In this paper, six Logistics 4.0 technology alternatives are determined as [16]:

- **Big Data Analytics (A1):**

Big data has started to advance in the logistics industry by transforming large-scale data volumes into valuable items to increase efficiency in capacity planning and vehicle path optimization.

- **Augmented and Virtual Reality (A2):**

Augmented reality can be mainly used for data collection, alerts sending of service and maintenance, and coordination of business.

- **Internet of Things (A3):**

Internet of Things has the potential to connect almost anything to the Internet and speed up data-driven logistics.

- **Robotics and Automation (A4):**

Robots can work alongside workers, supporting repetitive and physically demanding tasks in logistics operations.

- **Blockchain (A5):**

Blockchain can enhance trust and transparency among customers and stakeholders, supporting the automation of commercial and administrative processes.

- **Unmanned Aerial Vehicles (A6):**

With the use of unmanned aerial vehicles or drones in logistics, it is expected that there will be an increase in the operational efficiency of the first and last kilometer logistics networks and a reduction in risks and accidents through automatic delivery in remote areas.

3.2. Fuzzy AHP method

AHP has been first suggested by Saaty [17]. The fuzzy AHP method is a highly preferred technique in the literature. The steps of this method can be listed as:

Step 1. The evaluation matrix is built. The fuzzy linguistic expressions and triangular fuzzy numbers (TFNs) used for the fuzzy AHP method are provided in Table 1.

Table 1. Fuzzy AHP linguistic scale [18]

Linguistic term	Abb.	TFN
Equal	E	(1,1,1)
Equally Important	EI	(1,1,2)
Weakly More Important	WMI	(2,3,4)
Strongly More Important	SMI	(4,5,6)
Very Strongly More Important	VSMI	(6,7,8)
Absolutely More Important	AMI	(8,9,10)

Step 2. Linguistic terms are converted into TFNs. The structure of membership function of $\tilde{A}=(l,m,u)$ is given as [19]:

$$\mu_{\tilde{A}}(x) = \begin{cases} \frac{(x-l)}{(m-l)} & \text{if } l \leq x \leq m, \\ \frac{(u-x)}{(u-m)} & \text{if } m \leq x \leq u, \\ 0 & \text{otherwise.} \end{cases} \quad (1)$$

Step 3. α -cut method is used to produce α -cut fuzzy pairwise comparison matrices ($\alpha=0.5; \mu=0.5$).

Step 4. The optimality index is computed via [20]:

$$\tilde{a}_{ij}^{\alpha} = \mu a_{ij}^{\alpha} + (1 - \mu) a_{ij}^{\alpha}, \quad \forall \alpha \in [0,1]. \quad (2)$$

Step 5. The normalization of matrix is realized. Then, the local weight vector is computed [21].

Step 6. The Best Nonfuzzy Performance (BNP) value for each factor is calculated via [22]:

$$BNP_i = \frac{[(u_i - l_i) + (m_i - l_i)]}{3} + l_i, \forall i. \tag{3}$$

To check the consistency of the decision-making, the consistency ratios (CRs) are computed via the following equations:

$$CI = \frac{\lambda_{max} - n}{n - 1}. \tag{4}$$

$$CR = \frac{CI}{RI}. \tag{5}$$

where n is the number of factors, λ_{max} is the biggest eigenvector, RI is the random index, and CI is the consistency index. CR should be less than 0.1.

Step 7. Sub-criteria weights are obtained by applying the same steps. The final weights of sub-criteria are obtained by multiplying the weights of the main and sub-criteria.

3.3. Fuzzy TOPSIS method

In this study, Chen and Chen [23]'s fuzzy TOPSIS method is used. The steps of this method can be listed as [21]:

Step 1. Experts assess the alternatives by using the linguistic terms given in Table 2.

Table 2. Linguistic terms set used in fuzzy TOPSIS technique [24]

Linguistic term	Abb.	Fuzzy Numbers
Very Good	VG	(7, 10, 10, 10)
Good	G	(5, 7, 7, 10)
Fair	F	(2, 5, 5, 8)
Poor	P	(0, 3, 3, 5)
Very Poor	VP	(0, 0, 0, 3)

Step 2. The normalization of the decision matrix is realized as:

$$\tilde{R} = [\tilde{r}_{ij}]_{m,n}, i = 1, 2, \dots, m; j = 1, 2, \dots, n \tag{5}$$

$$\tilde{r}_{ij} = \left(\frac{a_{ij}}{c_j^+}, \frac{b_{ij}}{c_j^+}, \frac{c_{ij}}{c_j^+} \right) \tag{6}$$

where $C_j^+ = \max_i C_{ij}$.

Step 3. The calculation of the weighted normalized is obtained via the following equation:

$$\tilde{v}_{ij} = \tilde{r}_{ij} \otimes \tilde{w}_j \tag{7}$$

Step 4. The positive and the negative distances from the ideal solutions are found by applying the following formulae:

$$d_i^* = \sum_{j=1}^n d(\tilde{v}_{ij}, \tilde{v}_j^*), i = 1, 2, \dots, m; j=1, 2, \dots, n \tag{8}$$

$$d_i^- = \sum_{j=1}^n d(\tilde{v}_{ij}, \tilde{v}_j^-), i = 1, 2, \dots, m; j = 1, 2, \dots, n \tag{9}$$

where

$$A^* = \{v_1^*, v_2^*, \dots, v_n^*\} \tag{10}$$

$$A = \{v_1, v_2, \dots, v_n\} \tag{11}$$

$$d(\tilde{A}, \tilde{B}) = \sqrt{\frac{1}{4} \sum_{i=1}^n |x_i - y_i|^2} \tag{12}$$

Step 5. Then, the relative distance from the ideal solution is obtained as:

$$C_i = \frac{d_i^*}{d_i^* + d_i} \tag{13}$$

Step 6. The ranking of the alternatives is obtained grounded on their relative closeness.

4. Implementation of the methodology

4.1. Stage 1: Problem definition

In this part of the study, a technology analysis application will be made for a logistics company. The name of the company is not given for confidentiality reasons. The company is a national company that provides various logistics services on land, sea and airways to leading international companies from different sectors. On the other hand, the company, which regards technology investment as the most critical factor for growth rather than the necessity of change, attaches importance to innovative solutions. In this context, pilot projects are carried out within the scope of Logistics 4.0. The company, which manages many studies in line with Logistics 4.0, is ahead of its competitors in Logistics 4.0 technologies. In addition, the company managers, who will evaluate the expectations and Logistics 4.0 technologies, are experts with sufficient knowledge of logistics processes and technology.

4.2. Stage 2: Implementation of fuzzy AHP method

The criteria (firm expectations) are compared in pairs by experts using the terms provided in Table 1. Table 3 shows the expert assessment for the main criteria.

Table 3. Evaluation for main criteria

Linguistic Expressions			Fuzzy Numbers			
	C1	C2	C3	C1	C2	C3
C1	E	EI	EI	(1,1,1)	(1,1,2)	(1,1,2)
C2	-	E	-	(1/2,1,1)	(1,1,1)	(1/2,1,12)
C3	-	EI	E	(1/2,1,1)	(1,1,2)	(1,1,1)

The fuzzy AHP method is implemented by using equations (1)-(5). α -cut matrices ($\alpha=0.5$; $\mu=0.5$) are structured by using equation. Then, the matrices are normalized, and CRs are checked. These steps are repeated for all sub-criteria. Final global weights for each criterion are computed; they are provided in Table 4.

Table 4. Criteria weights

Main Criteria	Weights	Sub Criteria	Local Weights	Weights	Ranking
C1	0.412	C11	0.362	0.121	5
		C12	0.046	0.015	12
		C13	0.093	0.031	8
		C14	0.499	0.166	2
C2	0.260	C21	0.251	0.084	6
		C22	0.106	0.035	7

		C23	0.092	0.031	9
		C24	0.551	0.184	1
C3	0.328	C31	0.407	0.136	4
		C32	0.065	0.022	11
		C33	0.076	0.025	10
		C34	0.452	0.151	3

The fuzzy AHP method has shown that, the most critical criterion is determined as a reduction in cycle times of processes (C24). The second one is determined as ease of access to real-time data and accurate information (C14), and the third one is determined as advanced analytics for demand and order forecasting (C34).

4.3. Stage 3: Implementation of fuzzy TOPSIS method

Experts assessed the six Logistics 4.0 technology alternatives regarding the twelve criteria with the help of expressions in Table 2. The evaluations of the experts for the alternatives are provided in Table 5.

Then, equations (5) - (13) are applied to obtain a ranking list of the alternatives. The distances from the positive and the negative ideal solutions and the relative distance to the ideal solutions are calculated. The results of the fuzzy TOPSIS method are provided in Table 6.

Table 5. Evaluations for the alternatives

	C11	C12	C13	C14	C21	C22	C23	C24	C31	C32	C33	C34
A1	VG	F	VG	G	F	VP	G	P	F	F	P	VG
A2	VG	VG	G	VG	F	P	VG	F	VG	VG	VG	F
A3	G	G	F	VG	G	F	VG	F	VG	VG	G	G
A4	F	VG	F	F	G	F	VG	VG	F	F	G	F
A5	F	F	F	G	F	F	G	F	VG	VG	VG	P
A6	F	VG	F	G	VG	VG	G	F	G	G	G	P

Table 6. The ranking of the alternatives

	A1	A2	A3	A4	A5	A6
Di+	11.389	11.282	11.260	11.378	11.412	11.391
Di-	0.611	0.718	0.740	0.622	0.588	0.609
Ci	0.051	0.060	0.062	0.052	0.049	0.051
Ranking	4	2	1	3	6	5

The fuzzy TOPSIS method has shown that, the most suitable alternative for the company is the Internet of Things (A3).

5. Conclusion

In this study, an evaluation framework for assessing Logistics 4.0 technologies with fuzzy MCDM methods was presented. The twelve criteria and six alternatives were structured by examining the related literature and by consulting the experts. Then, this framework was integrated with fuzzy AHP and fuzzy TOPSIS methods to compute the criteria importance degrees and rank the alternatives, respectively.

A numerical application was provided to confirm the usefulness of the proposed methodology. At the end of the implementation, the results are given. For the company in the numerical example, the most appropriate Logistics 4.0 technology was the "Internet of Things." This result highlights the importance of the Internet of Things technology

for logistics industry. Internet of Things now has an intense influence over the Earth. Almost half of the world's population could access internet with their smartphones. Besides, the Internet of Things technologies has connected billions of objects. New communications technologies such as 5G networks promise better flexibility, higher speeds, and augmented volume for connecting things. Therefore, the expectation from the development of the Internet of Things and the next-generation wireless technologies enhancing the total visibility of supply chains, result in greater transparency and better service quality for operators and customers [16].

In future studies, it can be interesting to consider the dependence and the interaction between the criteria. In this context, Analytic Network Process (ANP) method can be applied, and the findings can be compared with the results of this study. Moreover, this technology assessment problem can be solved using other fuzzy MCDM techniques or design approaches (e.g. Quality Function Deployment).

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