JOURNAL ON EFFICIENCY AND RESPONSIBILITY IN EDUCATION AND SCIENCE

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Scientific journal of the Czech University of Life Sciences Prague JOURNAL ON EFFICIENCY AND RESPONSIBILITY IN EDUCATION AND SCIENCE, distributed by the Faculty of Economics and Management. Published quarterly. Executive editors: Ing. Martin Flégl, Ph.D., Ing. Igor Krejčí, Ph.D. and Ing. Tereza Sedlářová Nehézová. Editorial Office**:** ERIES Journal, Czech University of Life Sciences Prague, CZ 165 21 Prague 6 - Suchdol, Czech Republic, email: editor@eriesjournal.com, tel: +420 224 382 355.



volume 14
issue 2

**2021**

An international peer-reviewed journal published by
**Faculty of Economics and Management**
**Czech University of Life Sciences Prague**

editor@eriesjournal.com
www.eriesjournal.com
Online ISSN: 1803-1617
Printed ISSN: 2336-2375

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On June 3 – 4, 2021, the 18th International Conference on Efficiency and Responsibility in Education (ERIE 2021) took place at the Faculty of Economics and Management, Czech University of Life Sciences Prague. Due to the ongoing COVID-19 pandemic, the conference had again the virtual form as the last year. We are glad that even though the global situation did not allow to organize the present form of the conference, the conference attracted participants from the Czech Republic, Germany, Hungary, Mexico, Russia, Slovakia and the United States. Dr. Martin Daumiller, assistant professor at the University of Augsburg in Germany, was the keynote speaker this year. Dr. Daumiller presented the results of his research about faculty motivation, its theoretical approaches, relevance for learning and performance and the future directions in the research. Furthermore, other researchers presented topics related to current trends in education, psychological and mathematical aspects of online education and the impact of COVID-19 on teaching and learning. All the accepted articles and virtual posters of the ERIE 2021 conference, as well as conference proceedings from the previous years, are available on the conference website. Everybody is more than welcome to follow future updates about the upcoming 19th ERIE conference that will take place the first week in June 2022.

A couple of weeks ago, SCImago has published the annual Scimago Journal & Country Rank results for 2020. We are glad to announce that ERIES Journal has been ranked in the Q3 in the Education category again with SJR of .204. ERIES Journal presented positive tendencies in all evaluated areas, such as citations per document, total cites and external cites per documents. This result indicates that the editorial policy of the journal is of high quality and the published content attracts greater global scientific audience.

In the second issue of the ERIES Journal (Vol. 14, No. 2), we would like to present five articles from a collective of authors from the Czech Republic, Ethiopia and Mexico, whose central idea is related to the students' motivation in entrepreneurial education and volunteering, as well as to the impact of COVID-19 on the teaching and learning.

The first article "Students Preferences in Teaching Methods of Entrepreneurship Education" by Martin Pech, Petr Řehoř and Michaela Slabová deals with entrepreneurial education in higher education. The authors analyse students' interests in such education and their preference of the teaching method in entrepreneurial courses. The research is based on 214 students' responses from the Faculty of Economics and Faculty of Health and Social Studies at the University of South Bohemia in the Czech Republic. The results indicate that students from the Faculty of Economic prefer active teaching methods with expert lectures and business simulators, whereas the students from the Health and Social Sciences rather prefer special projects and counselling. In both cases, students require a combination of the theory with practice, so the teachers need to use various teaching methods to attract students' motivation.

In the second article "Volunteering of Czech College Students – Experience and Motivation", the authors Simona Činčalová and Martina Černá investigate students' motivation for volunteering and their experience with volunteering. The analysed sample includes 183 students of economics and 99 students of helping professionals study programs in Vysočina region in the Czech Republic. The results revealed two main observations. First, the biggest motivations for volunteering are the feeling of being useful, gaining new experience and skills. On the other hand, the lack of time and information are perceived as limitations. Second, considering the frequency of volunteering there is no relation to students' gender, study field and the volunteering experience. This analysis provides an opportunity for developing guidelines in promoting volunteering activities within the young population, as well as in society.

The third article "From F2F to ERT: University Students' Perception of Remote Learning During the COVID-19 Lockdown" from Katerina Dvorakova, Jaroslav Emmer, Renata Janktová and Kateřina Klementová explores the evaluation of emergency remote teaching (ERT) measures taken by the English department from the perspective of its students. The research is an ex-post-facto case study that aims to examine university students' experiences and perceptions related to the sudden shift from face-to-face to ERT mode of learning during the first COVID-19 lockdown. The authors analysed responses from 69 Bachelor's and 31 Master's degree students trained to become primary and lower-secondary English foreign language teachers. The results revealed that 25.3% of the students believe to have improved their IT skills throughout ERT and, also, see the flexibility of time management and work organisation as a beneficial aspect of ERT. Finally, the majority of the students expressed no change in the development of their language skills, which can be caused by the short period of the ERT at the time of the research.

In the fourth article "Promoting Effects of Abilities While Enhancing Probability of College-Success: A Moderation Role of Higher Education", the authors Lemecha Wariyo and Amare Asgedom investigated the total and conditional effect of college readiness on college success by university generations and departments. As part of the research, the authors also analysed the differences

in the probability of college success across departments and university generations. This study considered test-based decision-making quality in college readiness and success assessment as a major factor that affects the validity of direct higher education quality assessment. The sample includes in total 551 participants from the 1st, 2nd and 3rd generation universities, where 202 participants are from the first generation, 168 from the second generation and 181 from the third generation. The results indicate that the probability of college success at a value of college readiness significantly varied across the university generations and departments. The authors recommend redesigning college readiness depending on a rigorous curriculum and teaching-learning standards. The development of college readiness should be ensured through multidimensional early interventions, monitoring, and partnerships to develop student college readiness.

Finally, in the fifth article "Computational Self-Efficacy and Information Skills in Postgraduate Students in Administration at the Times of Covid-19", the authors Edgar Oliver Cardoso Espinosa, Jésica Alhelí Cortés Ruiz and María Trinidad Cerecedo Mercado analysed the levels of computational self-efficacy and information skills of postgraduate students in administration at the time of COVID-19 intending to determine their relationship in academic performance. 130 students from four Master's and Doctoral study programs in administration at Instituto Politécnico Nacional in Mexico participated in the study. The authors observed a direct and significant association between computational self-efficacy and information skills with academic performance. During the COVID-19 lockdown, the students had their average computational self-efficacy of 4.55, while the level of information skills was 4.00 on average. This observation implies that the students have both the belief of being successful and a positive state of mind to face the challenges generated by the presence of the coronavirus.

We would like to thank all reviewers who contributed to this second issue of 2021, as well as we would also like to thank all authors who have submitted their manuscripts to ERIES Journal. We hope that all our readers will find this issue interesting, and we also hope that ERIES Journal will contribute with new insights, research methods and analyses to the field of efficiency and responsibility in education as it has contributed so far.

Sincerely

**Martin Flégl**
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# CONTENT

*Full research paper*

# STUDENTS PREFERENCES IN TEACHING METHODS OF ENTREPRENEURSHIP EDUCATION

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## ABSTRACT

Entrepreneurial education has recently become popular at universities of economics almost all over the world. Various teaching methods play a significant role in the development of future entrepreneurs. Therefore, for a student to become a successful entrepreneur, it is essential to find the most effective tool for the teachers to support entrepreneurship education and find the ideal connection between the needs of the students and the right choice of a teaching method. There is a large gap between the needs of the business environment and university studies in this area. The research is based on 214 questionnaires filled in by the students from two different faculties. The paper aims to find and analyse the preferences of teaching methods for management students based on the following criteria: gender, faculty, degree of study. The students expected to be taught by active methods, e.g., expert lectures and business simulators. Differences in the use of teaching methods were the most evident among students from different faculties. The students of economic faculty prefer active methods to a greater extent than students of social studies. On the contrary, special projects and counselling are preferred teaching methods by students in health and social sciences.

## KEYWORDS

**Entrepreneurial education, management, students, teaching methods**

## HOW TO CITE

Pech M., Řehoř P., Slabová M. (2021) 'Students Preferences in Teaching Methods of Entrepreneurship Education', *Journal on Efficiency and Responsibility in Education and Science*, vol. 14, no. 2, pp. 66-78. http://dx.doi.org/10.7160/eriesj.2021.140201

**Article history**
**Received**
July 30, 2020
**Received in revised form**
December 26, 2020
**Accepted**
May 10, 2021
**Available on-line**
June 30, 2021

***Highlights***

- *Higher interest in entrepreneurship courses is offered to students in economics and at lower levels of study.*
- *Students prefer active teaching methods (e.g., lectures from experts).*
- *Gender differences were not statistically detected in the evaluation of teaching methods, while differences in some methods were proved by faculties.*

## INTRODUCTION

How to raise the entrepreneurial spirit and intentions of students? This question is interesting and should be solved by universities, especially by faculties of economic. In the future, the graduates of economics might work as experts in the business sector; their business plans, efforts, and successfully implemented plans should become the basis of the national economy and contribute to economic development. Due to this growing importance of power young student generations, the University of South Bohemia, the Faculty of Economics, has decided to survey facet Entrepreneurial education. Many universities working together with entrepreneurs, try to deal with the situation by closer cooperation. Potential candidates who start their careers at the University are becoming essential for the business sector's future development. The pressure on the academic environment to prepare the young generation to set up its own business and management is increasing. Universities are currently focusing their research in this direction, seeking the innovation of subjects that meet these requirements.

Qosja and Druga (2015) state that national governments develop small enterprises. They expect the employment rate improvement, dealing with unemployment and economic growth from the market attitude trend. Entrepreneurship has become an everyday buzzword (Matlay and Westhead, 2005). The authors of many scientific studies and researches discuss the relationship between economic growth and entrepreneurship. In the states of a proven positive relation, the jobs are created, the technological changes occur, and small enterprises survive successfully, as reported by Karanassios

et al., 2006. Entrepreneurship education (EE) is booming worldwide (Neck and Greene, 2011) and become important for future competitive advantage. According to Fayolle (2009), entrepreneurship education includes many activities. Their goal is to develop students' entrepreneurial spirit and to support their thinking, skills, and attitudes. They should learn to create business ideas, start a business, develop it, and innovate.

Talisayon (2009) mentions in their study that the students should be exposed to different teaching methods in which they should engage themselves to increase the quality of the whole educational process. However, the question is which methods are most effective in teaching and can attract students to run their new businesses. Binks (2005) also highlights the promotion of entrepreneurial behaviour and thinking in the educational process. By Deakins et al. (2005), education should change young students' mindsets, build their entrepreneurial culture, and help them see their future careers in entrepreneurship.

This study's motivation is related to the introduction of the new subject entrepreneurship into the management program at the University of South Bohemia in České Budějovice. First, we investigate the students' interest in participating in the entrepreneurship course. Furthermore, the research part was to determine the choice of methods by which the subject will be taught. This step is essential for the preparation of teaching tools. Later, it is necessary to determine the content of the course in cooperation with experts. The obtained results will be used to compile syllabi and select teaching methods to attract students to entrepreneurship education. Conclusions related to the preference of research methods can be generalised and similarly used to prepare or innovate other managerially or economically oriented subjects.

## Entrepreneurship Education

Entrepreneurship education aims to deepen the thinking, knowledge and skills needed to start a business (Neck and Corbett, 2018). Küttim et al. (2013) report in their study that entrepreneurial education has increased significantly, mainly due to the need to prepare students to cope with current changes in the work environment successfully. Entrepreneurship education aims to change the behaviour and attitudes of the students toward entrepreneurship. Jones and English (2004) state that the set of business lectures is intended to educate those interested in starting a business and developing it. After graduating, the students should understand entrepreneurship and become entrepreneurs (Hannon, 2005). In entrepreneurship education, skills, knowledge and attitudes important for future entrepreneurial activities are increasing (Hussain and Norashidah, 2015).

Arasti, Falavarjani and Imanipour (2012) highlight teachers' role and skills significantly influencing effective entrepreneurship education. To do this, teachers need to know and use various teaching methods to support and develop business. By Jones and Iredale (2010), it is necessary to change the teaching styles in entrepreneurial education, to be able to learn to deal with the issues creatively and immensely to arouse interest in entrepreneurship among the students. Entrepreneurship education should have a teaching approach at the university that helps students gain practical experience. This notion will allow them to increase their thinking about entrepreneurship (Ndou, Mele and Vecchio, 2019; Cui, Sun and Bell, 2019). A university teacher plays a vitally important in education (Figley, Eigen and Eigen, 2012). The teacher should know the students and know how to find effective learning (Ramos, 2015). Macaraeq (2007) wants to ensure that students complete each lesson as best as possible and successful.

University students have little interest in being entrepreneurs (Wongnaa and Seyram (2014). According to Luthans, Luthans and Luthans (2015) the desire for free work and self-efficiency is a motivation to study entrepreneurship and later to be an entrepreneur. Profit motives are also important for students to build new businesses (Choo and Wong, 2006). Students also want independence and autonomy (Stephan et al., 2015). Students with a need for success who are creative and innovative have a higher interest in entrepreneurship (Lautenschläger and Haase, 2011). Another motivating factor is risk tolerance (Segal, Borgia and Schoenfeld, 2005).

The first research question concerned the identification of students' interest in an entrepreneurship course. It means finding out how attractive the course is in terms of presentation (or marketing). The poorly publicised course will not arouse students' interest in studying. Determining students' interest in the course is the first step in deciding whether it makes sense to offer students this course as part of a study program. Students' interest in the entrepreneurship education course depends on their interest in entrepreneurship as a profession and their interest in teaching. Through marketing tools, universities can draw the attention of potential applicants to sign up for a course. However, the decision to become an entrepreneur largely depends on the self-efficacy and self-motivation of students (Kusumajanto, 2015). Entrepreneurship education usually acts as a mediator in shaping entrepreneurial intentions (Sha, Amjed and Jaboob, 2020; Li and Wu, 2019). Concerning these studies, we defined the first research question related to hypothesis 1:

*Research question 1: What are the students' interests in participating in entrepreneurship courses?*

## Teaching Methods of Entrepreneurship Education

There is also no uniform classification of teaching methods used in Czech literature. Authors who deal with the issue prefer a variety of perspectives and classify teaching methods differently. Smith (2006) deals with the reflection of contemporary modern teaching methods. These methods are divided into two groups in most of the publications. The first of them is called traditional methods (this includes traditional lectures). The second group is related to innovative (inductive) methods that are more action-oriented. Mwasalwiba (2010) also defines the traditional (passive) methods as formal lectures, compared to the innovative (active) methods, focusing on the students and the participation of both teachers and students in education.

Potter (2008) emphasises teaching methods of business planning, case studies, students' starting businesses, business games, student entrepreneurs' teams and networks, an internship in small companies, feasibility studies, training in

communication, getting advice in starting small businesses, distance education, and external cooperation and offers business simulations, games, analysis, and discussion of real businesses, group work, mentoring, networking (shared experience), tutoring, action learning, problem-oriented method, peer group support, expert advice, and intensive counselling, and access to business networks as teaching methods of entrepreneurship. The second research question deals with determining the teaching methods. The preference of the entrepreneurship method is discussed in various numbers of articles, for example, Solomon (2008), Gatti, Ulrich and Seele (2019). The main factors mentioned in related studies that influence students' preferences are gender (Daim, Dabic and Bayraktaroglu, 2016; Johansen and Foss, 2013; Marques et al., 2018; Nowinski et al., 2019), the field of study or faculty studied (Bae et al., 2014; Parsyak, Solesvik and Parsyak, 2014; Salminen et al., 2014), or year of the study (Hassan et al., 2015; Laukkanen, 2013). Based on these studies, we defined the following research question related to hypothesis 2:

*Research question 2: What are the students' preferences in learning methods useful for developing entrepreneurship?*

### Traditional (Passive, Deductive) Methods

Prince and Felder (2006) characterise the traditional methods as deductive. The lectures present the basic concepts and principles; students repeat and gradually learn business terminology. The traditional methods include lectures, exercises, creating a business plan, and a project compared to the innovative methods based on a more active pedagogical approach (Tasnim, 2012). According to Sogunro (2004), such traditional methods do not activate the entrepreneurial spirit. Bennett (2006) also considers them ineffective for business development.

Lectures of experts. The majority of the entrepreneurs tell the students their stories from practice; they acquaint the students with the business experience. All forms and types of discussion methods have mutual communication in common. The participants' exchange views on the topic, argue and work together to solve the discussed problem. Either an expert or a specialist from the field or an enterprise is invited to attend the course. Such a person prepares a particular lecture or demonstration on the students' current issues with the participants' final active discussion. The advantage is that the student gets information on current events and might be inspired and learn and express their opinion (Maňák, 2011).

Task and essays. Working with text usually means a teaching method based on textual information processing, which aims to acquire new knowledge, extend and deepen, and consolidate the knowledge. This method belongs to classical teaching methods. In the form of courses, the students are able to test the subject matter in writing. Testing is done by elaborating tasks that verify whether the lessons were understood or not. The essays teach the students how to present both the written word and content to clearly express the essay's aim and all other essentials (Hospodářský, 2013).

Special projects are such activities that are based on topics that connect theoretical knowledge with practice. This method is, therefore, on the border between active and passive methods. A teacher directly assigns the tasks to the students, and the teacher is instead a supervisor of the projects. The students deal with the issues with the teacher's help and based on their knowledge and experience. Cooperation is an important part. Project learning focuses primarily on the student's experience. The essence of experience is that the subjects acquire their importance as they integrate into the human experience and used in a joint activity. This experience is based on students' active relation and the surrounding - natural and social - environment. This method's benefit is that students can experience practice (active method) and theory (passive method). Enterprises usually order projects related to the academic world. Students in these projects demonstrate their creativity in fulfilling a particular topic based on the entrepreneurs' assignment (Heinonen and Poikkijoki, 2006). Furthermore, after successful processing, an ordered project is sometimes implemented directly in the enterprise (Mazáčová, 2007).

### Innovative (Active, Inductive) Methods

As Prince and Felder (2006) reported, the inductive methods guide the students to discuss questions and deal with the problems. It is, therefore, active learning in which the students work together as a team. Such studying includes the active and collaborative approaches, having a high positive effect on the learning outcomes (for more see Prince, 2004). By Bennett (2006), the innovative methods require that the teacher not test and examine so much, but they should focus on the student's self-knowledge.

Active methods can be divided in different ways. According to the complexity of preparation, classification into categories (games, situational methods, discussion methods, problem methods), according to the purpose and goal of use in teaching (diagnostics, repetition, motivation, new forms of interpretation). Maňák and Švec (2003) present the following activating methods: discussion, heuristic, problem-solving, situational, staging and didactic games. Vališová and Kasíková (2011) divides activating methods concerning the degree of activity into heuristic (interview), discussion (discussion connected with explanation), problem (solving a problem situation), situational (case study, conflict situations, real-life case studies), staging and simulation, didactic games (learning - word, graphic, movement), project (solution of a relatively large form of the project), research (a problem of the research form). The other active methods might be based on the experiential learning of the full Kolb's cycle, constructivism, making videos, shooting films from the business environment (Verduyn, Wakkee and Kleijn, 2009), or excursions in the enterprises (Balan, 2014), etc.

Kassean et al. (2015) confirm in research that the experience and practical actions of a real entrepreneur will involve students more in learning and improve their entrepreneurial skills. Haneberg and Aadland (2019) support importance of the methods solving real problems and the presentation of experts. Solomon (2008) also emphasises the case study, business planning, discussions, research projects, computer simulations, entrepreneurship, visiting sites, and class practice. Torben (2010) thinks of entrepreneurship camps as teaching methods.

Commarmond (2017) deals with the improvement of critical thinking among students and presents illustrative examples. In entrepreneurship education, it is necessary to provide internships in companies, visit companies, and allow students to conduct interviews with successful entrepreneurs (Wardana et al., 2020). These methods apply to teach in context and provide students with real experience. This focus will increase their entrepreneurial willingness and skills (Potishuk and Kratzer, 2017). According to Ahmad, Abu Bakar and Ahmad (2018), there are experimental teaching methods: consultancy project, project-based learning, counselling/mentoring, practical training and working with entrepreneurs, start your own business.

A new level of entrepreneurship education innovation brings business simulations and playing games (Chang and Rieple, 2013). Business games are, by Tasnim (2012), a fundamental and useful teaching method. However, there are various obstacles to using games. Kirriemuir and McFarlane (2004) notice the following: the very inclusion in teaching, the teacher needs enough time in the class to use them. They must not waste time in teaching, and the teacher must be convinced of their benefits. Business games include factory simulation and training models focused on demonstration and comprehensive presentation of networked digital applications in a real production environment. Business simulation represents the real situation using a simplified simulation model imitating some business situations or processes (Pasin and Giroux, 2011). This method is active and very popular. Management simulators are augmented virtual reality, in which particular cases from business practice are tested.

The case studies acquaint the students with the main problem. They are used for the application of theoretical knowledge in a real business situation. Accordingly, the studies are based on real facts and deduction (in the correct answer). If more than one solution is possible, they need to be addressed within the context.

Counselling in psychology is a complementary method. However, it plays the social and supportive role of directing the students to which profession they are suitable for or as support in expert consultations. Students try different personality tests. Students in a group deal with issues in the field of management and business. Some of them act in an advisory role (Ahmad, Abu Bakar and Ahmad, 2018).

Role-playing is closely related to the importance of roles in organisations (Corbett, 2005). Roles can be defined as the interface between individual and organisation daily as the organisational agents assume roles by adopting positions and executing functions with particular expected behaviour (Nagler, 2009). It is an active teaching method that enables the students to "try" what it is like being a manager, a marketing specialist, a CEO, an auditor, and a personnel advisor. The students react to different situations in a role, and they deal with standard practice. By including classroom activity, the students acquire new knowledge while acquiring essential skills such as organisational and communication skills and, last but not least, developing life strategies. A student practices the practical application of knowledge, skills, and attitudes (Tůmová et al., 2014).

## MATERIALS AND METHODS

The paper aimed to find out what teaching methods related to entrepreneurship would be welcomed by students of management. A partial aim deals with the question of the students who are interested in entrepreneurship courses. Overall, 214 questionnaires were filled by the students of the University of South Bohemia in České Budějovice in 2018–2019. Data collection took place in the lessons of the course management. The overall return on the questionnaires was therefore very high and amounted to almost 95%. The teachers of the course distributed the questionnaires to selected students who filled them out. The obtained questionnaires were used for subsequent data analysis and statistical processing.

The research sample represents all students of the Faculty of Economics (FE) and Health and Social Studies (FHSS) who have a course of management as part of full-time study programs, i.e. a total of 1012 students (according to internal data of the study department). The overall margin of error is estimated as 5.96% at a 95% confidence interval. We determined the research sample distribution by the quota selection method using the gender, faculty, and year of the study quota characteristics.

We used the weighted approach to the one-sample chi-squared test to analyse the distribution goodness of fit between the sample and the population (Parke, 2013). In gender, the total student population is characterised by a ratio of 30.5% to 69.5% (men vs women), where chi-squared is 0.629 and $p$-value 0.428. The ratio of faculties in the population sample is 93.77% to 6.23% (FE vs FHSS). However, chi-squared is 152.709 with $p$-value < 0.001. The ratio of 1st class students to students from other (2nd-5$^{th}$ class) classes of study in the population is 43.3% to 56.7%. We explain this high proportion of 1st class students compared to other class students in the population sample by the very high failure rate in the first year of study (according to the internal data from annual report in 2018 was a failure rate of 1st class full-time students for bachelor programme about 48.7% and in follow-up master's degree about 10.3% at Faculty of Economics). In this case, chi-squared is 0.601 and $p$-value 0.438. For all cases when $p$-value indicates that the null hypothesis of equality of the two sets of proportions is not rejected. Then, the distribution of the sample is similar to the distribution for all students in the population. The sample's representativeness can be confirmed due to the low margin of error and the distribution of the gender and year of the study.

Students are divided into the following categories:

a) by the gender of the students into 60 men and 154 women;
b) by the faculty into 57 students of the Faculty of Health and Social Sciences and 157 students of the Faculty of Economics;
c) by the year of the study into 87 students from 1st class and 127 students from other classes.

The structured questionnaire contained questions related to the area of entrepreneurship education. The closed questions are based on information obtained through personal communication with selected university experts from education area. The questionnaire was pre-tested for the validity of 30 student

participants who were asked to respond to items measuring the theoretical structure. These participants were also asked to identify any ambiguities that they might disclose in the draft questionnaire. Based on their feedback, we made some minor changes in the questionnaire.

In the paper, two questions from the questionnaire are analysed: "Are you interested in an entrepreneurship support course and other business training courses?" and "Evaluate the learning methods/techniques that you believe are useful for developing business qualities". For the research purpose, the researcher has considered the best proven eight methods used in management education: tasks and essays, special projects, business games, case studies, counselling in psychology (personality tests), role-playing, business simulators and lectures of experts. We chose education methods that are currently used in courses of management at the Faculty of Economics. Investigated students know these methods. Thus it is appropriate for students to fill a designed questionnaire. These variables were measured with a 7-point Likert scale (anchored 1 with "Little useful method", and 7 with "Very useful method"). Conceptually and empirically, the measure is based on evaluating the utility of a method for developing entrepreneurship competencies.

The internal reliability of a questionnaire shows a high level of consistency. The result of Cronbach´s alpha coefficient is 0.8146, with an average correlation among items 0.3648. The value of Cronbach´s alpha of each item varies from 0.7735 to 0.8190. The recommended value for applied education research is, according to Taber (2018) value of Cronbach Alpha between 0.7 and 0.95.

The results were subjected to statistical analysis by the nonparametric Mann-Whitney test. The test compares two unrelated, independent samples. The result of performing a Mann Whitney *U* Test is a *U* Statistic. Observations should follow the normally distributed shape. The *U* test is computed based on rank sums rather than means. In computations for the Mann-Whitney *U* test, a continuity correction is applied. Formula 1 describe Mann-Whitney *U*-test statistics for each of the two samples (Corder and Foreman, 2009: 17):

$$U_i = n_1 n_2 + \frac{n_i\left(n_i+1\right)}{2} - \sum R_i \qquad (1)$$

Where $U_i$ is the test statistic, $n_i$ is the number of values, $n_1$ is the number of values from the first sample of students, $n_2$ is the number of values from the second sample of students, and $\sum R_i$ is the sum of the ranks.

After the *U* statistics are computed, they must be examined for significance (Corder and Foreman, 2009: 58). Working hypotheses, which form the subject matter of verification on the 1% and 5% level of significance, are the following:

$H_1$: There is no difference in ranks of one group of students to have significantly higher (or lower) interest in participating in entrepreneurship courses than those of the other.

$H_2$: There is no difference in ranks of one group of students to evaluate significantly higher (or lower) learning methods useful for the development of entrepreneurship than those of other students.

We have specified and divided these null hypotheses according to the following three criteria:

- gender (students group of men and women)
- faculties (the group of FE and FHSS students)
- year of the study (the group of students from the first year of the study and others)

$H_A$: The alternative statistical hypothesis is that the ranks of one group of students are systematically higher (or lower) than those of the other (the difference exists in at least one case).

The results present for clarity achieved the level of significance (*p*-value) at alpha level 0.05. The software Statistica 12 is used to calculate statistical tests.

After that, significant relations were tested for order variables through correlations. Spearman rank correlation is one of the most common measures and takes values from the interval [-1; 1]. The closer the calculated value of the correlation coefficient is to 1 (or -1), the tighter the relationship between the variables. If each variable is in the same order for both variables, then the coefficient is positive (known as the direct dependence). The negative correlation is at the negative value of the correlation coefficient. It means that the ascending values of the first variable correspond to the descending order of the values of the second variable. The value of 0 indicates the statistical independence of both variables (Řezanková, 2007: 68):

$$r_s = 1 - \frac{6 \cdot D^2}{n\left(n^2-1\right)} \qquad (2)$$

## RESULTS

Results are divided into three sections: the student's interest in the course of entrepreneurship, the overall evaluation of teaching methods for the development of entrepreneurship, and the evaluation of these methods according to different criteria.

### a) The interest of the student in the course of entrepreneurship

The first question in the questionnaire was related to the interest in the course of business and entrepreneurship for students. This question corresponds to hypothesis $H_1$. Table 1 summarises the most important statistical characteristics. The authors chose a three-type classification of the sample - by gender, type of faculty, and year of study. The rating of the interest in the courses scored from one (least useful) to seven (very useful).

| | Number | Average | Median | Standard deviation | Coefficient of variation |
|---|---|---|---|---|---|
| Men | 60 | 4.63 | 5 | 1.60 | 34.63 |
| Women | 154 | 4.25 | 4 | 1.65 | 38.86 |
| FHSS | 57 | 3.86 | 4 | 1.72 | 44.46 |
| FE | 157 | 4.54 | 5 | 1.58 | 34.91 |
| 1 years | 87 | 4.76 | 5 | 1.54 | 32.36 |
| Other years | 127 | 4.08 | 4 | 1.66 | 40.70 |
| Total | 214 | 4.36 | 4 | 1.64 | 37.73 |

**Table 1: Interest of the student in the course of entrepreneurship (source: own calculation)**

The average value of all students' interest was 4.4, indicating a moderate to higher interest in the courses. On average, men are more interested in entrepreneurial courses (4.6), by approximately 0.3 points than women. A more significant difference in interest was revealed regarding the other criteria in the survey. The students of the Faculty of Economics (4.5) are more interested than the students of the Faculty of Health and Social Studies, by about 0.6 points. Even the first-year students (4.8) are more willing to attend this course by more than 0.7 points than the students of higher grades.

The working hypothesis $H_1$ was at the 5% level of significance rejected for the groups of students divided according to the faculty characteristics ($p$-value = 0.0120). Similarly, we rejected the hypothesis at the 1% level of significance for the groups of students divided according to the year of the study ($p$-value = 0.0025). The differences between both groups of students were statistically proven. The ranks of the group of students of the Faculty of Economics have significantly higher interest to participate in the course of entrepreneurship or other training courses than the group of students of the Faculty of Health and Social Sciences. Similarly, the group of students in the first year of the study (first-class) has a significantly higher interest in participating in the entrepreneurship course or other training courses than others. However, we fail to reject the null hypothesis $H_1$ for the characteristics of students' gender. There is no tendency for the male students' ranks to have significantly higher (or lower) interest to participate in a course of entrepreneurship or other training courses than female students ($p$-value = 0.1002) – see table 2.

| Characteristics of students | *U* | *Z* | *p*-value |
|---|---|---|---|
| According to gender | 3961.0 | -1.6437 | 0.1002 |
| According to faculty | 3483.0 | -2.5136 | 0.0120* |
| According to years of study | 4202.0 | -3.0177 | 0.0025** |

*Note: the statistically significant differences at the significance level of 5% are marked *, and at the significance level of 1% are marked **.*

**Table 2: Results of testing hypothesis $H_1$ (source: own calculation)**

### b) Overall evaluation of teaching methods for the development of entrepreneurship

In this section, the different teaching methods, as evaluated by the students, are introduced. As shown in Figure 1, the students prefer entrepreneurship education methods, which are connected with "live information". It means that the most popular are seminars where experts in the entrepreneurial environment will share their experiences. This finding is an excellent opportunity for students to ask their individuals questions. The next favourite method is business simulators which can prepare very similar conditions for business/ entrepreneurial carriers. This method can support a student to run their own business and eliminate the fear of failure. On the same level is the method" Project with a specific target on a particular topic in the business area. The third interesting method is "playing the role "that belongs to active learning. Other teaching methods like Psychology counselling, case studies, business games are useful but not so outlined as active methods. The less popular with, the less effective method which students choose are seminars and task in lectures. The main result is that students prefer an EE method to gain real information and try some real business situation than traditional teaching methods. They want to develop individual competencies suitable for their personality.

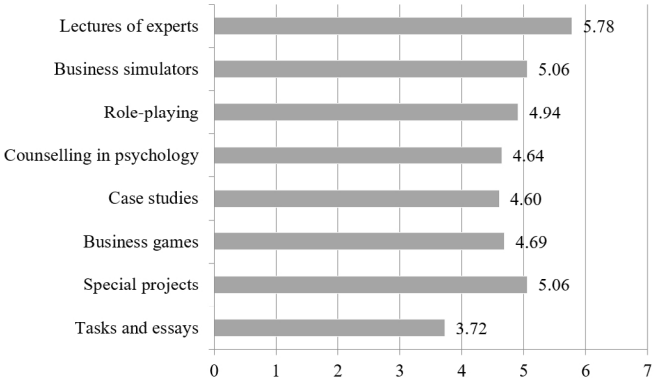


**Figure 1: Evaluation of teaching methods for the development of entrepreneurship (average), 2018-2019 (source: own calculation)**

As revealed by the correlation coefficients of different teaching methods, there is a relatively strong correlation. The strongest correlations ($r$ > 0.45) are marked in bold in Table 3. The relation of business games and business simulators is seen in the Spearman correlation coefficient, which is the highest among the two methods ($r$ = 0.6340). Similarly, there is a moderate correlation (Akoglu, 2018) between business games and business simulators ($r$ = 0.5147), case studies with business games ($r$ = 0.4983), and case studies with special projects ($r$ = 0.4983). The lowest Spearman's correlation coefficient was between lectures from experts and tasks and essays ($r$ = 0.1064).

| | a | b | c | d | e | f | g | h |
|---|---|---|---|---|---|---|---|---|
| (a) Tasks and essays | | 0.4269 | 0.2011 | 0.2968 | 0.2286 | 0.2538 | 0.2219 | 0.1064 |
| (b) Special projects | 0.4269 | | 0.4457 | **0.4933** | 0.3078 | 0.4291 | 0.4079 | 0.2834 |
| (c) Business games | 0.2011 | 0.4457 | | **0.4983** | 0.3501 | 0.4276 | **0.5147** | 0.2292 |
| (d) Case studies | 0.2968 | **0.4933** | **0.4983** | | 0.3890 | 0.4073 | 0.4488 | 0.2696 |
| (e) Counselling in psychology | 0.2286 | 0.3078 | 0.3501 | 0.3890 | | 0.3361 | 0.3399 | 0.1762 |
| (f) Role-playing | 0.2538 | 0.4291 | 0.4276 | 0.4073 | 0.3361 | | **0.6339** | 0.2597 |
| (g) Business simulators | 0.2219 | 0.4079 | **0.5147** | 0.4488 | 0.3399 | **0.6339** | | 0.3832 |
| (h) Lectures of experts | 0.1064 | 0.2834 | 0.2292 | 0.2696 | 0.1762 | 0.2597 | 0.3832 | |

**Table 3: Relationships among methods, 2018-2019 (source: own calculation)**

From the above results, we conclude that there are some relations between methods. We can divide the observed methods into three groups. The first group consists of case studies that correlate with special projects and business games. These are methods using practical examples solved by students in lessons (case studies), individually or in a team in the field (special projects), or business (managerial) games in an online environment or a prepared practical exercise. The second group consists of modern simulators in an online environment, or simulations in a real environment using the role-playing method, or scenarios prepared in case studies. The last group consists of passive methods such as tasks and essays, lectures of experts. This division of teaching methods can also be used to classify teachers.

**c) Evaluation of teaching methods according to different criteria**

The last section is teaching methods evaluated by three criteria: gender, faculty, and year of the study. This finding corresponds to hypothesis $H_2$.

## Evaluation of teaching methods according to gender

On average, women rank the experts' lectures (5.74) best, followed by special projects (5.19), which is almost 0.5 points more than men. Even men prefer the experts' lectures (5.88); however, the business simulators are the second (5.07). Tasks and essays are considered the least suitable teaching method (average below 3.9) – see table 4.

| | Women | Men | *U* | *Z* | *p*-value |
|---|---|---|---|---|---|
| Tasks and essays | 3.84 | 3.42 | 4018.5 | 1.5013 | 0.1333 |
| Special projects | 5.19 | 4.70 | 3727.0 | 2.2484 | 0.0245* |
| Business games | 4.66 | 4.77 | 4581.0 | -0.0962 | 0.9234 |
| Case studies | 4.60 | 4.60 | 4616.5 | -0.0075 | 0.9940 |
| Counselling in psychology | 4.73 | 4.42 | 4067.0 | 1.3833 | 0.1666 |
| Role-playing | 4.92 | 4.88 | 4423.0 | 0.4930 | 0.6220 |
| Business simulators | 5.05 | 5.07 | 4457.0 | 0.4088 | 0.6827 |
| Lectures of experts | 5.74 | 5.88 | 4256.5 | -0.9420 | 0.3462 |

*Note: the statistically significant differences at the significance level of 5% are marked *, and at the significance level of 1% are marked **.*

**Table 4: Evaluation of teaching methods for the development of entrepreneurship (according to gender), 2018-2019 (source: own calculation)**

At the 5% level of significance, we do not reject the null hypothesis $H_2$ for students' gender characteristics to evaluate most learning methods. The working hypothesis $H_2$ was at the 5% level of significance rejected (*p*-value = 0.0120) only for the special projects. The differences between groups of male students and female students were statistically significant. The results show that the ranks of female students' ranks evaluate the "special project" significantly higher than the group of students of the male students. In other cases (other learning methods), differences according to the gender of the students were not statistically proven.

## Evaluation of teaching methods according to faculty

On average, the Faculty of Economics students rank the experts' lectures (5.39) as the second-best method of teaching, following the special project (4.84). Students of the Faculty of Health and Social Sciences prefer the lectures of experts (5.92), followed by business simulators (5.26), which is almost 0.8 points more than the EF students. The tasks and essays are the least popular for both groups – see table 4.

The working hypotheses $H_2$ for the characteristics of students' faculty was at the 5% level of significance rejected for learning methods: tasks and essays, business games, business simulators, lectures of experts. The differences between groups of students from different faculties were statistically significant (see *p*-values in table 5). Results show that these entrepreneurship learning methods evaluate the group of students of the Faculty of Economics significantly higher than the Faculty of Health and Social Sciences group. Business games and business simulators, in particular, are special teaching methods designed for economic subjects. The Spearman correlation coefficient proves the relation of both these methods. The value of the coefficient is the highest in the whole sample of these two methods. No statistically significant differences were found between the faculties' students in the sample for other teaching methods.

| | FHSS | FE | *U* | *Z* | *p*-value |
|---|---|---|---|---|---|
| Tasks and essays | 3.33 | 3.87 | 3580.5 | -2.2679 | 0.0233* |
| Special projects | 4.84 | 5.13 | 4057.0 | -1.0675 | 0.2858 |
| Business games | 4.18 | 4.88 | 3472.0 | -2.5443 | 0.0109* |
| Case studies | 4.74 | 4.55 | 4090.0 | 0.9778 | 0.3282 |
| Counselling in psychology | 4.82 | 4.58 | 4093.0 | 0.9693 | 0.3324 |
| Role-playing | 4.68 | 4.99 | 3997.5 | -1.2148 | 0.2244 |
| Business simulators | 4.49 | 5.26 | 3266.0 | -3.0882 | 0.0020** |
| Lectures of experts | 5.39 | 5.92 | 3509.5 | -2.5433 | 0.0110* |

*Note: the statistically significant differences at the significance level of 5% are marked *, and at the significance level of 1% are marked ***

**Table 5: Evaluation of teaching methods for the development of entrepreneurship (according to faculty) 2018-2019 (source: own calculation)**

### Evaluation of teaching methods according to the year of study

On average, the first-year students enjoy experts' lectures (5.99) followed by the business simulators (5.39). Higher grades students also prefer the experts' lectures (5.64); however, followed by the special project (4.99). Both groups of students cite tasks and essays as the least suitable teaching method; the method is evaluated by almost 0.6 points less than in the first-year students – see table 6.

At the 5% level of significance, we reject the null hypothesis $H_2$ for the characteristics of students' year of the study only for the learning methods: tasks and essays and business simulators. The differences between groups of students from the first year of study (1st class) and other study years (other classes) were statistically significant. The results show that the group of students from the first year of the study (first-class) evaluate those entrepreneurship learning methods significantly higher than others. The first-year students are more interested in classical teaching methods (tasks and essays) and business simulators regarding the new methods. This result may not be surprising, explained by their positive attitude to study. The problem, however, is the declining interest in these methods in subsequent years. In other cases (learning methods), differences according to the study's year were not statistically proven.

| | 1st year | Other | *U* | *Z* | *p*-value |
|---|---|---|---|---|---|
| Tasks and essays | 4.06 | 3.50 | 4430.5 | -2.4979 | 0.0125* |
| Special projects | 5.15 | 4.99 | 5366.0 | -0.3640 | 0.7159 |
| Business games | 4.78 | 4.63 | 5335.0 | -0.4319 | 0.6658 |
| Case studies | 4.64 | 4.57 | 5347.5 | -0.4045 | 0.6859 |
| Counselling in psychology | 4.61 | 4.67 | 5411.5 | 0.2576 | 0.7967 |
| Role-playing | 4.97 | 4.87 | 5378.0 | -0.3350 | 0.7376 |
| Business simulators | 5.39 | 4.83 | 4344.5 | -2.7137 | 0.0067** |
| Lectures of experts | 5.99 | 5.64 | 4782.5 | -1.7597 | 0.0785 |

*Note: the statistically significant differences at the significance level of 5% are marked *, and at the significance level of 1% are marked ***

**Table 6: Evaluation of teaching methods for the development of entrepreneurship (according to the year of study), 2018-2019 (source: own calculation)**

## DISCUSSION

Traditional teaching methods, such as essays and seminars focused on theoretical knowledge, were ranked last. Active teaching methods include business simulators, role-playing, and special projects where students are able to connect their knowledge into practice. These methods can also support students to run their own business and eliminate the fear of failure. A modern approach to teaching and using new methods is exciting and stimulating for students, coinciding with the research results in Nigeria. Olokundun et al. (2008) state that practical business activities are an essential and valued teaching method. According to the results of a study conducted in Switzerland, active approaches to education (games, simulations) are suitable for developing critical thinking and motivation (see Gatti, Ulrich and Seele, 2019). Solomon (2008) reports that the most used teaching methods in business include lectures, case studies, and plans creation. Tan and Ng (2006) emphasise active learning and dealing with practical problem situations. Foreign research confirms that active teaching methods are more suitable for teaching entrepreneurship.

### Gender differences

Gender differences in entrepreneurship are often discussed in scientific research and papers (see Hughes et al., 2012, Minniti and Naudé, 2010; etc.). In our research, men are more interested in entrepreneurial courses by approximately 0.3 points than women. However, the authors did not prove the hypothesis ($H_1$) that any group of students divided by gender is more interested in an entrepreneurship course. According to the answers, it was confirmed that the students, according to gender, are similarly interested in such courses. Díaz García and Jiménez-Moreno (2010) do not show any significant gender differences in the business plans in their research. Nowinski et al. (2019) researched the Visegrad countries and proved that entrepreneurship education is crucial for women. DeTienne and Chandler (2007) point out that men and women's business skills are not the same. Wehrwein, Lujan and DiCarlo (2007) confirm that male students prefer more different teaching methods than female students. The Association of Small and Medium-sized Enterprises and Crafts of the Czech Republic and the Ministry of Industry and Trade state that women in the Czech Republic have started to do more business than men in recent years (CFO World, 2017).

In the Czech Republic, more men start a business in the southern and eastern regions. This statement shows a higher interest of students in business education from the South Bohemian region at the University. The European Commission in the report (2013) points out that women's entrepreneurship's basic features are very similar in the US and the EU. Dilli and Westerhuis (2018) state that women see fewer business opportunities, so they do not do so much business (especially in demanding industries) and are also not interested in developing their businesses compared to men. According to Munoz-Fernandez, Rodriguez-Gutierrez and Santos-Roldan (2016), women are more responsible and disciplined than men. However, they also do not invest so much in business, and they are afraid to take risks and be proactive.

### Faculty differences

As revealed by different faculties, the results logically lead to higher interest in courses among the Faculty of Economics students. This finding also results from the focus of the

faculties. The Faculty of Health and Social Studies students are more prepared for employment in public and social administration. There are not any subjects involved in the business in the offer of the courses at this faculty. Differences between faculties are significant ($H_2$) for learning methods: tasks and essays, business games, business simulators, lectures of experts. It is clear that, in particular, business games and business simulators are special teaching methods for economic subjects. Marques et al. (2018) confirmed the positive impact of entrepreneurship education on the university students' innovation and pro-activity (especially the students in business and social sciences programs). However, no effect is found concerning the students of technical programs.

In their study, Westhead and Solesvik (2016) compare the students of business and technical programs. The same groups report a high interest in the business. For women, this interest is reported to be lower. Parsyak, Solesvik and Parsyak (2014) reveal that entrepreneurship education is given only to students of the business programs. They learn business theory, and they attend practical courses, usually in higher grades. Bae et al. (2014) confirm a more substantial business plan and business education relation than general business education and a business plan.

### Year of study differences

According to years of study, there are different preferences of interest in entrepreneurship courses ($H_1$). Students of higher years have less interest in entrepreneurship courses. Apparently, during their studies, they had already completed courses in which they learned about business and therefore, did not need further courses to study or require future vocational training. First-year students would welcome such courses. These students do not know what they will learn during their studies in business or management. However, entrepreneurship and entrepreneurship do not appear in compulsory subjects at University of South Bohemia in Ceske Budejovice. Differences in the learning methods between students according to their year of the study are significant ($H_2$) only for tasks and essays and business simulators. Notably, first-year students have the highest interest in traditional teaching methods (tasks and seminar papers) and business simulators are most interested in new teaching methods. This result may not be surprising and can be explained by their positive approach to learning. However, the growing problem is the declining interest in these methods in subsequent years.

In their study, Hassan et al. (2015) point out that entrepreneurship education at the University of Kebangsaan Malaysia (UKM) is implemented in entrepreneurship courses for the first-year students of 12 faculties, regardless of their study program. Each faculty has a coordinator providing business activities. Lujan and DiCarlo (2006) state the student preferences according to which they obtain the necessary information. These include visual, auditory, readable, and written forms. About one-third of the first-year students prefer the presentation of information. Laukkanen (2013) emphasise, how important exploring academic entrepreneurship is for positive influences on entrepreneurship and innovation by each university faculty.

## CONCLUSION

Entrepreneurial education and its importance are increasing. It is necessary to prepare the students to start their own business due to changes in the market and environment. There are new intentions from the Czech Republic's state politics that early business can be positively influenced and supported. On the other hand, new startups can motivate more beginning young entrepreneurs. By Gibb (2002), entrepreneurial education is a broader concept than just teaching about entrepreneurship. Entrepreneurial education, as reported by Küttim et al. (2013), significantly contributes to the development of entrepreneurship and the creation of business plans.

Despite many studies, e.g., Sieger, Fueglistaller and Zellweger (2011), this issue is not very well researched in the Czech Republic on this theme in other foreign countries. The University of South Bohemia, Faculty of economic has decided to find out more continuity between students reaches to set up their own business and the education at Universities, which can support the competencies and entrepreneurial spirit. The interest in the study of entrepreneurial courses was higher for men, the Faculty of Economics students, and students of the first year ($H_1$). Entrepreneurship courses must acquaint students with ways to overcome obstacles, failures. They must gain experience from real entrepreneurs (Bauman and Lucy, 2019). Mwasalwiba (2010) also states in the study that the education of managers needs significant changes (as the number of entrepreneurs needs to be increased). Olugbola (2017) and Coduras, Saiz-Alvarez and Ruiz (2016) state that economic, managerial or psychological knowledge impacts good preparation for business.

The survey results show that students prefer active teaching methods to entrepreneurship over traditional methods prevalent in management teaching. Significant differences in the use of teaching methods were found, especially among different faculties ($H_2$). As revealed by the correlation, the most significant dependency was demonstrated in simulators and business games, so it is desirable to combine these two entrepreneurship education methods. More practical approaches and active methods are needed in entrepreneurship education, and students require them much more (Lima et al., 2014). Entrepreneurship teachers need to use a variety of teaching methods and combine theory with practice. Active teaching methods should be used more often. Foreign experts also confirm this finding.

The paper contributes to the progress in entrepreneurship education theory because it presents different teaching methods and students' preferences. Educational programs focused on management and business do not place such an emphasis on the development of entrepreneurship. The study programs focus on teaching various business activities of a business manager, such as most of the Faculty of Economics programs of the University of South Bohemia in České Budějovice. The implication for developing a new entrepreneurship course related to creating a study plan and syllabi enables the use of active methods. From a practical point of view, the paper will contribute to improving the offered entrepreneurship courses. The next step to improve entrepreneurial education at the Faculty of Economics at University of South Bohemia can

be future cooperation with absolvents recently graduated and having current awareness from praxis in business.

There are some limitations related to the paper. The selected research sample includes more students of Health and Social Studies faculty than in total population. In reality, a smaller percentage of the Faculty of Health and Social Studies students participate in study the management because of less focus of programs on management and economics. The goodness of fit test results shows that surveyed students cannot generalise well to all students in the sample concerning the faculty attribute. The selection of the research sample may have skewed the results due to potential biases. However, the increase in the sample ratio (from 6.26% to 26.64%) was not high and still maintains a relatively distinctive sample proportionality.

Further, we admit that several (not analysed) methods can be researched. We used only eight methods, with which the students of the faculties are acquainted. Their evaluation is easier for the student of the investigated university and faculties. Other methods should also be considered in further research. The results show the situation in the preferences of teaching methods for students before the coronavirus crisis. Due to the significant expansion of distance learning opportunities, we plan research to reveal possible changes in students' preferences for new online methods.

## ACKNOWLEDGEMENT

This paper was supported by project OPVVV CZ.02.2.69/0.0/0.0/16_015/0002348 "Rozvoj JU – ESF".

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*Full research paper*

# VOLUNTEERING OF CZECH COLLEGE STUDENTS – EXPERIENCE AND MOTIVATION

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## ABSTRACT

Volunteering is an activity that enables the development of an individual's competency and is also an area of interest both of society and the academic community. This article aims to compare the motivation for volunteering and the experience of volunteering with students within helping professions and economics. For the purpose of this research, a questionnaire about volunteering was compiled. The article presents the research results into volunteering of Czech students of economic and non-economic study programmes of the College of Polytechnics Jihlava (n = 282). According to the results, the field of study and the frequency of volunteering depend on each other. Students' gender and the frequency of volunteering do not depend on each other; neither do the study field and the volunteering experience. The biggest motivations for volunteering are feeling useful, gaining new experience and skills. On the other hand, the lack of time and information (ignorance) are perceived as limitations. The study provides an opportunity for developing more guidelines in promoting volunteering activities within the young population and society as a whole.

## KEYWORDS

**College, experience, motivation, research, students, volunteering**

## HOW TO CITE

Činčalová S., Černá M. (2021) 'Volunteering of Czech College Students – Experience and Motivation', *Journal on Efficiency and Responsibility in Education and Science*, vol. 14, no. 2, pp. 79-88. http://dx.doi.org/10.7160/eriesj.2021.140202

**Article history**
**Received**
August 10, 2020
**Received in revised form**
January 16, 2021
**Accepted**
April 27, 2021
**Available on-line**
June 30, 2021

***Highlights***

- *The field of study and volunteering experience do not depend on each other, but there is dependence between the field of study and volunteering frequency.*
- *Students' gender and the frequency of volunteering do not depend on each other; neither do the study field and the volunteering experience.*
- *There is a lack of information for students about volunteering; a system needs to be implemented.*

## INTRODUCTION

Volunteering is a freely chosen activity, performed for the benefit of others without the right to remuneration. The current situation of volunteering in the Czech Republic is as problematic as in other post-communist countries, where volunteering was devalued in the second half of the twentieth century. After the regime change, there was a relatively rapid increase in the interest in both volunteers and volunteering in various fields, including social.

Each of us can probably define the concept of volunteering, a volunteer and voluntary activity in our own way. The idea of volunteering does not have a uniform definition in the literature. The essence of volunteering is relatively easy to define. The big problems are identifying the boundaries where volunteering ends and where it begins. The individual authors do not agree, for example, on whether or not to include an individual who performs voluntary activities for their immediate surroundings as a volunteer (Haski-Leventhal et al., 2019; Savitz et al., 2008; Rochester et al., 2010). The same attitude to the definition of volunteering can be seen in the context of volunteering performance. It is always of personal volition and without the right to remuneration. By volunteering, Pospíšilová, Frič and Tošner (2011) mean unpaid work for people beyond the family and close friends which is also for the benefit of the surrounding environment. The work is considered unpaid even when expenses are reimbursed, or a symbolic reward is given. According to Lockstone-Binney et al. (2010), volunteers and volunteering contribute to communities in most countries and cultures. They are of widespread importance to leisure because volunteers constitute a significant component within the sector´s workforce in various roles and contexts. Both individual and structural determinants must be taken into account when

considering volunteering. It means that attitudes and motives significantly affect volunteering. But significant differences among population groups are noticed, e. g. wealthy individuals are three times more recruited (Musick and Wilson, 2008).

There are many different studies on students' volunteering (e.g., Cunha, Mensing and Benneworth, 2019; Power, Boughen and Ames, 2019; Kogan and Kvon, 2019 or González et al., 2019). Febriani and Selamet (2020) ask if the brand image makes a difference in college students' intention to volunteer for non-profit organisations. The results indicate the importance of the brand image in increasing volunteering intention. This fact can inform Nurse Practitioners of Oregon (NPO) about the necessity to create better strategies to recruit volunteers. Schech et al. (2020) describe how international volunteerism contributes to progress processes of endogenous capacity in non-profit organisations.

Motivations for volunteering can be various (Shier, Larsen-Halikowski and Gouthro, 2020). Lockstone-Binney et al. (2010) emphasise the interdisciplinary perspective which means economic, psychological and sociological aspects. Berei (2020) analyses the characteristic of volunteering and student's motivations. The conclusions present traditional students' motivations such as helping others, relational and self-development intentions, and global motivational factors like learning new languages and discovering new cultures. The results of the research of Moore, Warta and Erichsen (2014) show that the strongest motives for volunteering are values (altruistic volunteering) and understanding (new learning experience). The most common volunteer work in organisations focused on health and wellness, serving children or delivering education and reducing poverty. Shye (2010) does not ask what motivates volunteers, but to what extent volunteering rewards an individual. Haski-Leventhal et al. (2020) point out that volunteering has benefits for students as well as for universities and colleges. Mitic (2020) finds out that volunteering and studying abroad represent an educational experience that promotes democratic outcomes. Volunteering is also a form of moral engagement in which young people engender a sense of duty and responsibility for others.

Navickas, Simkus and Strunz (2016) claim that volunteering has a positive impact on students' life quality. Volunteering can help young people control their stress, build their independence, win other acquaintances, find new friends, improve their communication skills and teamwork, win work experience and reduce awareness of new tasks and situations. Volunteering can contribute to students´ employability due to new experiences and its benefits in terms of job opportunities. According to Moreno (2013), social factors (connecting to the family, school, community) positively affect young people's health. Volunteering can be one way to improve community ties, gain valuable life experiences, and feel valued and important. Khasanzyanova (2017) writes that volunteering benefits both personal and professional development. Volunteering also has health benefits such as increasing positive emotions, reducing depression, lowering cholesterol levels, blood pressure, and body mass index.

According to Wilson (2000), volunteers become more often young people who have parents with volunteering experience. These people usually have higher education and socioeconomic status and are more often believers. Young people are dedicated to volunteering during their puberty. Declining trends appear between adolescence and early adulthood. Then interest in volunteering grows again and peaks at middle age. Osoba (2017) writes that college alumni are significantly more engaged (not only in volunteering but also donating, attending a public hearing on a local issue or signing a petition) than people with primary or secondary education. And individuals in their thirties are more engaged than young people under 24 (in this research it means at least one action in public interest over the past five years). Involved people are more satisfied. According to Bierhoff (2006), long-term voluntary activity is influenced more by the individual's personality characteristics than spontaneous short one-time help. Bierhoff (2006) and Křivohlavý (2003) state that prosocial behaviour is based primarily on empathy, social responsibility, the idea of a just world, an internal locus of control and self-efficacy. Besides, it is formed by other factors, especially the helper's person and personality, the social environment, situational factors, and the person and the character of the recipient of prosocial behaviour. It is also proven that good mood and weather have a positive effect on prosocial behaviour. The influence of a negative mood on prosocial behaviour is not entirely clear. It cannot be said this is a wrong matter, e.g., a feeling of guilt or sadness strengthens the willingness to help.

The article aims to compare the motivation for volunteering and volunteering experience with students of helping professions and economics. Understanding the motivations for volunteering is very important because it determines the levels and types of support we provide them. Students of helping professions are supposed to be more engaged in volunteering (due to more opportunities) than students of economics. Our interest is to confirm or refute this myth. The theoretical background was discussed. The following sections will present materials and research methods, results, discussion and conclusion.

## MATERIALS AND METHODS

### Sample

The survey on student volunteering took place among the students of the College of Polytechnics Jihlava in the winter semester of the academic year 2019/2020 (before the crisis caused by COVID-19). A questionnaire was filled in by 183 students of economics (the study programmes – Finance and Management, Travel and Tourism) and by 99 students of helping professions (the study programmes – Clinical Social Worker, General Nurse, and Midwifery). The College of Polytechnics Jihlava is the only tertiary education institution in the Vysočina Region, the Czech Republic. It offers accredited Bachelor's study programmes and follow-up Master's programmes. Nearly 2000 full-time and part-time students are enrolled in the programmes at present. The study programmes provide a well-balanced combination of theoretical knowledge and practical skills following the needs of the regional labour market. As the name "polytechnics" suggests, this college offers a bright range of study programmes. Volunteering and social responsibility of students and academic workers are an

essential part of the college culture. Volunteering is a topic of a long-term multidisciplinary academic research. Work activities of assisting professionals are oriented on material, financial, informational, cognitive or emotional benefits of clients. The work quality depends not only on the theoretical knowledge, experience, and qualification of the worker, but also on the structure of the personality and prosocial behaviour (Mlčák, 2010).

In a questionnaire, we ask about students' gender, the study programme, and their volunteering experience (how often they volunteer, what motivates them, and when they started volunteering). In the case of no experience, we ask about the reason and if they are considering involvement in volunteer activities. (See the questionnaire in Appendix).

Following research hypotheses and research questions are the subject to verification:

- H1: There is no relationship between students´ study program and their volunteering.
- H2: There is no relationship between college students' study programme and their volunteering frequency.
- H3: The gender of students and their volunteering frequency do not depend on each other.
- RQ1: What is the most frequently mentioned motivation for student volunteer activities?
- RQ2: What is the most significant limitation for student volunteer activities?

## Chi-Square test

To meet the aim of the article, the basic test for determining the interdependence of two categorical variables, the chi-square test of independence, was chosen. It is one of the nonparametric tests for which no prerequisites are needed (Mareš, Rabušic and Soukup, 2015; Landau, 2004).

In general, we can compile a table with expected data by recalculating the individual fields of the Pivot Table according to the formula (Elliott and Woodwart, 2007):

$$n_{ij} = \frac{R_i S_j}{n} \quad (1)$$

The recalculated expected values use the expected percentage of individual frequencies.

Suppose we should evaluate the intensity of the dependence of only one relation. In that case, the best interpretable coefficients are Phi φ and Cramer's $V$ because they take values from the interval [0, 1]. So, we can say whether the addiction is very weak - weaker - moderately strong - strong. Phi is defined by (Landau, 2004):

$$\varphi = \sqrt{\frac{x^2}{n}} \quad (2)$$

Cramer's $V$ is an extension of the above approach and is calculated as (Mareš, Rabušic and Soukup, 2015)

$$V = \sqrt{\frac{x^2}{n\,df^*}} \quad (3)$$

Phi divided by the square root of $df^*$. Thus, the guidelines are (Pallant, 2011):

| $df^*$ | Small | Medium | Large |
|---|---|---|---|
| 1 | .10 | .30 | .50 |
| 2 | .07 | .21 | .35 |
| 3 | .06 | .17 | .29 |
| 4 | .05 | .15 | .25 |
| 5 | .04 | .13 | .22 |

**Table 1: Effect sizes for Cramer's V (source: Pallant, 2011)**

All calculations are performed in IBM SPSS Statistics according to the Řezanková (2017), Pallant (2011), Mareš, Rabušic and Soukup (2015), Landau (2004), Veres, Eva and Cavanagh (2020) and Elliott and Woodwart (2007).

## RESULTS

The aim of the article is to compare the motivation for volunteering and volunteering experience with students of helping professions and economics. Three research hypotheses and two research questions were formulated and evaluated. They are interconnected and the answer to the research questions complement the verification of the hypotheses.

*H1: There is no relationship between students´ study program and their volunteering. In other words, the study programme and volunteering experience do not depend on each other.*

H1 alternative: The study programme and volunteering experience depend on each other.

In our paper variable **Field of Study** is divided into two groups – "eco" as economic disciplines (Finance and Management, Travel and Tourism) and "non-eco" as helping professions (Clinical Social Worker, General Nurse and Midwifery). The variable **Experience in volunteering** is described by "yes" or "no". The following hypothesis will discuss the frequency of volunteering.

In our research, we want to find out whether the study programme depends on whether students have experience in volunteering or not. At first, the relationship between the two categorical variables was calculated using a contingency table (see Table 2). There was a total of 282 respondents, of which 143 (50.7 %) had no experience in volunteering and 139 (49.3 %) had some. 52.5 % of students with positive experience were students of economics, while 49.3 % were students of helping professions (non-economic disciplines). According to the Chi-Square test, we can decide on the dependence or independence. In this case, when the differences between the expected and observed frequencies are small, then we can say that the variables are independent. The $p$-value of the Chi-Square test was 0.148 (see Table 3) and at the significance level of 0.05, we do not reject the null hypothesis about the independence of variables. The field of study and experience with volunteering do not depend on each other.

| | | | Experience | |
|---|---|---|---|---|
| | | | No | Yes |
| Field of Study | eco | Count | 87 | 96 |
| | | Expected Count | 92.8 | 90.2 |
| | | % within Field of Study | 47.5 % | 52.5 % |
| | | % within Experience | 60.8 % | 69.1 % |
| | non-eco | Count | 56 | 43 |
| | | Expected Count | 50.2 | 48.8 |
| | | % within Field of Study | 56.6 % | 43.4 % |
| | | % within Experience | 39.2 % | 30.9 % |

**Table 2: Field of Study * Experience Crosstabulation (source: own calculation)**

| | Value | *df* | Asymp. Sig. (2-sided) | Exact Sig. (2-sided) | Exact Sig. (1-sided) |
|---|---|---|---|---|---|
| Pearson Chi-Square | 2.093[a] | 1 | .148 | | |
| Continuity Correction[b] | 1.748 | 1 | .186 | | |
| Likelihood Ratio | 2.098 | 1 | .147 | | |
| Fisher's Exact Test | | | | .170 | .093 |
| Linear-by-Linear Association | 2.086 | 1 | .149 | | |
| N of Valid Cases | 282 | | | | |

*a. 0 cells (0.0 %) have expected count less than 5. The minimum expected count is 48.80.*

*b. Computed only for a 2x2 table.*

**Table 3: Chi-Square Tests (source: own calculation)**

*H2: There is no relationship between the study programme of college students and the frequency of volunteering.*
H2 alternative: The study programme of college students and the frequency of volunteering depend on each other.

Variable **Frequency** is described by numbers 0 – 4 where 0 means no volunteering, 1 = once a year, 2 = once a half a year, 3 = once a month and 4 = once a week). We can see from Table 4 that the higher the frequency of students' volunteering is the fewer students are involved. There are small differences among the study programmes (see Table 4). For example, only 4.4 % of economics students and on the other hand, 10.1 % of helping profession students volunteer once a week. Then 18.6 % of economics students and 8.1 % of "non-eco" students volunteer once a half a year.

| | | | Frequency | | | | |
|---|---|---|---|---|---|---|---|
| | | | 0 = no | 1 | 2 | 3 | 4 = weekly |
| Field of Study | eco | Count | 87 | 37 | 34 | 17 | 8 |
| | | Expected Count | 92.8 | 33.7 | 27.3 | 17.5 | 11.7 |
| | | % within Field of Study | 47.5 % | 20.2 % | 18.6 % | 9.3 % | 4.4 % |
| | | % within Frequency | 60.8 % | 71.2 % | 81.0 % | 63.0 % | 44.4 % |
| | Non-eco | Count | 56 | 15 | 8 | 10 | 10 |
| | | Expected Count | 50.2 | 18.3 | 14.7 | 9.5 | 6.3 |
| | | % within Field of Study | 56.6 % | 15.2 % | 8.1 % | 10.1 % | 10.1 % |
| | | % within Frequency | 39.2 % | 28.8 % | 19.0 % | 37.0 % | 55.6 % |

**Table 4: Field of Study * Frequency Crosstabulation (source: own calculation)**

| | Value | *df* | Asymp. Sig. (2-sided) |
|---|---|---|---|
| Pearson Chi-Square | 10.029[a] | 4 | .040 |
| Likelihood Ratio | 10.358 | 4 | .035 |
| N of Valid Cases | 282 | | |

*a. 0 cells (0.0 %) have expected count less than 5. The minimum expected count is 6.32.*

**Table 5: Chi-Square Tests (source: own calculation)**

In this case, when the differences between the expected and observed frequencies are big, then we can say that the variables are dependent. The *p*-value of the Chi-Square test was 0.040 (see Table 5) and at the significance level of 0.05, we reject the null hypothesis about the independence of variables. The study programme and volunteering frequency depend on each other.
The strength of the dependence can be measured using the association coefficients. In our case, we used Cramer's *V*, where the *p*-value takes the value 0.189 (see Table 6). With degrees of freedom *df* = 4 (see Table 5), it can be deduced that the dependence between the variables field of study and frequency is moderately strong. It is closely related whether a student studies economic or uneconomic branch at the college and how often operates volunteering, closely related. This may be because, for example, the Clinical Social Worker and General Nurse programmes have a closer relationship to volunteering than the Tourism study programme.

| | | Value | Approx. Sig. |
|---|---|---|---|
| Nominal by Nominal | Phi | .189 | .040 |
| | Cramer's *V* | .189 | .040 |
| | Contingency Coefficient | .185 | .040 |
| N of Valid Cases | | 282 | |

**Table 6: Symmetric Measures (source: own calculation)**

*H3: The gender of students and the frequency of volunteering do not depend on each other.*
H3 alternative: The gender of students and the frequency of volunteering depend on each other.

According to Table 7, 115 (50.9 %) out of 226 women and 28 (50.0 %) out of 56 men have never done volunteering. Only 1 man (1.8 %) and 17 (14.4 %) woman volunteer once a week.

| | | | Frequency | | | | |
|---|---|---|---|---|---|---|---|
| | | | 0 | 1 | 2 | 3 | 4 |
| Gender | women | Count | 115 | 39 | 34 | 21 | 17 |
| | | Expected Count | 114.6 | 41.7 | 33.7 | 21.6 | 14.4 |
| | | % within Gender | 50.9 % | 17.3 % | 15.0 % | 9.3 % | 7.5 % |
| | | % within Frequency | 80.4 % | 75.0 % | 81.0 % | 77.8 % | 94.4 % |
| | men | Count | 28 | 13 | 8 | 6 | 1 |
| | | Expected Count | 28.4 | 10.3 | 8.3 | 5.4 | 3.6 |
| | | % within Gender | 50.0 % | 23.2 % | 14.3 % | 10.7 % | 1.8 % |
| | | % within Frequency | 19.6 % | 25.0 % | 19.0 % | 22.2 % | 5.6 % |

**Table 7: Gender * Frequency Crosstabulation (source: own calculation)**

The *p*-value of the Chi-Square test is 0.509 (see Table 8) and at the significance level of 0.05, we do not reject the null hypothesis about the independence of variables. The gender and experience in volunteering do not depend on each other.
Beyond the hypothesis, we determined two research questions for better illustration of students' volunteering:

*RQ1: What is the most frequently mentioned motivation for student volunteer activities?*
*RQ2: What is the most significant limitation for student volunteer activities?*

| | Value | *df* | Asymp. Sig. (2-sided) |
|---|---|---|---|
| Pearson Chi-Square | 3.297[a] | 4 | .509 |
| Likelihood Ratio | 3.967 | 4 | .411 |
| N of Valid Cases | 282 | | |

*a. 1 cells (10.0 %) have expected count less than 5. The minimum expected count is 3.57.*

**Table 8: Chi-Square Tests (source: own calculation)**

| Motivation | Number of students |
|---|---|
| I feel useful | 67 (48 %) |
| I will gain new experience and skills | 65 (47 %) |
| I will use my skills | 4 (3 %) |
| I make new friends | 2 (1 %) |
| I want to fill my free time | 1 (1 %) |
| Religious beliefs | 0 (0 %) |
| I want to work in this area | 0 (0 %) |
| Total | 139 (100 %) |

**Table 9: Motivations of students for volunteering (source: own calculation)**

From the results (see Table 9 and 10), students feel useful and gain new experience and skills when volunteering. The main reason for volunteer activities is not using their skills, making new friends or filling the free time. On the other hand, the students consider a lack of time and a lack of information to be the most significant limitations. The fact that volunteering is not paid does not seem to be a problem for students.

| Limitation | Number of students |
|---|---|
| I do not have time | 72 (50 %) |
| I would like to but I do not know how to get involved | 48 (34 %) |
| Volunteering doesn't tell me anything | 12 (8 %) |
| I do not want to. It's unpaid | 11 (8 %) |
| Volunteers have a bad reputation | 0 (0 %) |
| Total | 143 (100 %) |

**Table 10: Limitations of students for volunteering (source: own calculation)**

Finally, students were asked if they were considering involvement in volunteer activities. Nobody answered "no, by no means". They said "yes" if they had more free time. Five students needed to be asked for volunteering.

## DISCUSSION

Nowadays, students' volunteering is a trendy topic for articles (Bang, Won and Park, 2020; Young et al., 2020; Juliá-Sanchis, 2020; Dogan, 2020). But we state there is a lack of research about the comparison between students' volunteering in different study programmes. This finding was crucial for the decision to carry out our research. And it is not easy to describe the voluntary activities of students. The diversity of the student population is reflected in the variety in the engagement. Some students are involved in their local communities and their activity is not marked as student volunteering. The College of Polytechnics Jihlava is the only public institution of tertiary education in the Vysočina region. In general, communities, organisations, municipalities, and various associations rely on students' volunteer activities without precisely defined rules and understanding all aspects. It would be appropriate to develop a system for mapping students´ volunteering.

Mlčák (2010) carried out a research to find out the differences in volunteering between students of assisting professions (in this case also pedagogical study programmes) and students of economic study programmes (national economy, regional development, financial journalism, etc.) at Technical University of Ostrava, Czech Republic. His respondents were only females. His research did not consider the number, the frequency and the length of volunteering activities and was more psychologically oriented. The students of assisting professions have richer experience with volunteering. The results of this research are, therefore, in conflict with the results of our survey. However, we must keep in mind that the basic files and methodology were not exactly the same. He found out statistically significant differences in the level of basic personality factors between these two groups of students. Students of assisting professions have a lower neuroticism level and a higher level of altruism, emotional behaviour, empathetic fantasy, etc. That is why we could concentrate more on economic students to increase their interest in volunteering.

Similar research was also realised at the University of South Bohemia in České Budějovice (Bezstarostiová, 2015). The author found out that 19 % of students of Faculty of Economics (FE) and 54 % students of the Faculty of Health and Social Sciences (FHSS) were active volunteers. The differences between the two groups of students (economic and uneconomic branch) were more significant in this research than in our survey (52.5 % and 49.3 %). Most of them (63 %) are long-term volunteers. Most of the students of FHSS chose the field of education and worked with children and youth. Most of the students of FE worked as volunteers for communities. The most important motivational factor for both groups were social motives (strengthening of relationships). Chapman and Morleye (1999) and Fletcher and Major (2004) found out that women were more inclined to volunteer. Compared to that, Tomšů (2015) states that there is no difference between woman and men concerning volunteering. Also, according to our research, gender is not the determining factor.

The findings of the study from Barton, Bates and O'Donovan (2019) indicate that students were motivated to undertake voluntary extra-curricular work to give them a work-based experience that would enhance their prospects for both employment and post-graduate study. Students also discussed the impact this type of transformative and experiential learning had on their degree and their satisfaction whilst they were at their higher education institution. Febriani and Selamet (2020) emphasize the importance of brand image in increasing volunteering intention. The research by Joseph and Carolissen (2019) suggests that the desire to help others (value) and learning interpersonal skills (understanding) are core reasons for student volunteerism. The results of our survey are consistent with the stated outputs. The biggest motivation for volunteering is to feel useful, gain new experience and skills, use their skills, make new friends, fill free time, and work in this area. Another motive based on our research is a religious belief.

To limitations of the paper, our research was realised between 10/2019 and 3/2020, it means before pandemic of COVID-19. During this difficult period, volunteering was a significant part of our society (Nanavaty, 2020; Ludvigsen and Hayton, 2020; Cullum et al., 2020). It was necessary to sew masks, to help vulnerable group (seniors and people with health

problems) with shopping. New research among students should be conducted after this crisis. Socialisation as a part of each organisation is also very important for corporate social responsibility (Glonti et al., 2020; Berei, 2020). Lachance (2020) provided another preview. A particular activity impacted by this pandemic is leisure. Within leisure, volunteering is an important activity to enhance social outcomes (e.g., civic participation) and the survival of organisations and events.

The situation associated with volunteering is changing not only in the Czech Republic, but also in other countries. Müllerová (2011) writes that volunteering is seen as something special, and that lack of information and little experience is the reason for not involving volunteers in organisations. Nowadays, most organisations working with volunteers have volunteer coordinators and approach their selection and management professionally and consciously rather than intuitively and randomly (Dostál et al., 2020). It follows that students have and will have more possibilities to find the best place for their volunteering on the one hand. And, on the other hand, their experience gained through volunteering will be more appreciated when looking for a job.

Volunteering as a manifestation of active citizenship naturally falls into the field of civic education (Palán and Langer, 2008). Ministry of Education, Youth and Sports in the Czech Republic (MŠMT, 2020) prepared an important document Strategy of the educational policy until the year 2030+. It aims to define vision, priorities and goals of educational policy. One part is focused on the competencies needed for civic, professional and personal living. It can be assumed that volunteer activities will get more in mind as activities that enable the development of these competencies. Khasanzyanova (2017) writes that tertiary education does not provide all of the knowledge and skills required to succeed in modern society. Soft skills (personal and interpersonal skills) can be developed by volunteering and it is an important part of students' learning process and makes students' overall experience of higher education more relevant, active, and enjoyable. Volunteering is part of the so-called third role of universities. Each tertiary education institution approaches it a little differently. The only Volunteer centre founded by a university in the Czech Republic is operated by Palacky University Olomouc (Dobrovolnické centrum Univerzity Palackého, 2020).

Its activity consists of coordinating the volunteer activities of students and staff. The centre keeps a register of offers mainly from the given region, as well as records of already worked volunteer hours. Other colleges and universities were also very active in volunteering during the coronavirus pandemic emergency. However, the management of volunteer activities fell under various organisational units. This, of course, also implies a different degree of professionalism in coordinating current needs in society and the possibilities of helping students and employees. In the case, the vice-rector of studies led the volunteering. Not only the students of the fields which were the focus of attention in this article but also the others actively participated. Medical students were able to use their competencies and knowledge. They worked beyond their practices and working hours in hospitals and health and social care institutions. Technical students focused on 3D printing and helped with the production of protective shields. They also dealt with the diagnosis of potentially ill patients by monitoring with a thermal camera. Students of economics branches helped with purchases and with processing at the offices (VSPJ, 2020).

At present, however, there is practically a lack of summary information on how the academic sector provides organisational and financial support for its students' volunteer activities. The volume of volunteer work and its structure are not clear. According to studies of different authors and our results, competent persons of colleges should concentrate on students of the economic field of study to provide them an opportunity to participate in volunteering activities. Likewise, students do not have enough information and often do not even know how to get involved in these activities.

## CONCLUSION

Volunteering, i.e., the willingness of a person to devote their time, energy, knowledge, knowledge, and skills to benefit other people or society without the right to remuneration, is a phenomenon experiencing a revival in our country in recent years. The article presents the research results into volunteering of 282 Czech students of economic and non-economic study programmes of the College of Polytechnics Jihlava. According to the results, the field of study and frequency of volunteering depend on each other. The frequency of volunteering does not depend on the gender, not even the field of study and the experience with volunteering. The biggest motivations for volunteering are feeling useful and gaining new experience and skills. On the other hand, the lack of time and information (ignorance) are perceived as limitations. This study provides an opportunity for developing more guidelines in promoting volunteering activities within the young population and society as a whole.

For the future, as the importance of the online education is increasing (Kuncová and Vojáčková, 2015; Kostolányová, Šarmanová and Takács, 2012), we could suppose a growth of the online volunteerism (Alony et al., 2020; Şimon, 2019; Katsuragawa, Shu and Lank, 2019). Naqshbandi et al. (2020) studied the motivational drivers of the online volunteering. According to the authors, online environments help eliminate some of barriers. It provides the inclusion of marginalized demographics, who cannot participate in traditional forms of volunteering due to geographical, physical, or other barriers. On the other hand, online platforms can introduce new obstacles especially when the medium transforms the social interactions important to volunteers. Fukuzawa et al. (2020), Lee (2020) and Babb et al. (2020) lifted the importance of social network sites for volunteering because if we are talking about students´ volunteering, the younger generation´s widespread use of the online social network has raised. According to Lee (2020), these platforms can be useful tools for getting the word out and recruiting episodic volunteers.

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## APPENDIX

### QUESTIONNAIRE – VOLUNTEERING OF UNIVERSITY STUDENTS

Dear students, in the following questionnaire we would like to ask you questions about volunteering. The questionnaire is anonymous and by filling it out you will contribute to the mapping of volunteer activities of VŠPJ students. Check one answer for each question. Thank you for your responsible approach to completing the questionnaire!

Ing. Simona Činčalová, Ph.D., Mgr. Martina Černá, Ph.D.

1. Gender:

❒ Female
❒ Male

2. Field of your study:

❒ Clinical Social Worker
❒ General Nurse, Midwifery
❒ Finance and Management
❒ Travel and Tourism

3. Do you have experience with volunteering?

❒ Yes
❒ In case of the answer Yes, please follow questions 4, 5 and 6
❒ No
❒ In case of the answer No, please follow questions 7 and 8

4. If you answered Yes to question 3, how often do you volunteer?

❒ once a week
❒ once a month
❒ once a half a year
❒ once a year

5. If you answered Yes to question 3, what motivates you to volunteer?

❒ I feel useful
❒ I will use my skills
❒ I make new friends
❒ I will gain new experience and skills
❒ I want to keep fit / to fill my free time
❒ religious beliefs
❒ I want to work in this area
❒ other motivation: ……..

6. If you answered Yes to question 3, when did you start volunteering?

❒ before studying at university
❒ during studying at university

7. If you answered No to question 3, why?

❒ I do not have time
❒ I do not want to, it's unpaid
❒ Volunteering doesn't tell me anything
❒ I would like to, but I do not know how to get involved
❒ Volunteers have a bad reputation
❒ anotheranswer:…….

8. If you answered No to question 3, are you considering involvement in volunteer activities?

❒ No, by no means
❒ Yes, only if someone close to me gets involved
❒ Yes, if anyone asks me to
❒ Yes, if I have more free time
❒ another answer: ……..

*Full research paper*

# FROM F2F TO ERT: UNIVERSITY STUDENTS' PERCEPTION OF REMOTE LEARNING DURING THE FIRST COVID-19 LOCKDOWN

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## ABSTRACT

In the spring of 2020, the University of South Bohemia was one of the innumerable higher education institutions which was obliged to move its instruction online in order to comply with the COVID-19 regulations. This article explores the evaluation of emergency remote teaching (ERT) measures taken by the English department from the perspective of its students. It presents and discusses findings gathered from a questionnaire completed by 99 respondents. The questionnaire centres around four areas of interest: satisfaction with ERT, comparison of face-to-face (F2F) vs. online learning experiences, perceived stress level during ERT, and acquisition of skills. The results show how students responded to the emergency procedures and which factors they considered essential in terms of satisfaction and stress. Furthermore, they reveal thought-provoking insights on aspects such as integrating elements of online teaching into F2F instruction, developing various skills in lockdown, and motivation for learning. Our findings are analysed in terms of aspects and factors which are viewed as efficient or inefficient by students in a time of crisis. Thus, this research may contribute not only to better preparedness should circumstances requiring ERT return, but also to a more complex re-evaluation of instructional approach at university level.

## KEYWORDS

**ERT (emergency remote teaching), F2F (face-to-face) instruction, online learning, student satisfaction, university education**

## HOW TO CITE

Dvořáková K., Emmer J., Janktová R., Klementová K. (2021) 'From F2F to ERT: University Students' Perception of Remote Learning During the First COVID-19 Lockdown', *Journal on Efficiency and Responsibility in Education and Science*, vol. 14, no. 2, pp. 89-100. http://dx.doi.org/10.7160/eriesj.2021.140203

**Article history**
**Received**
September 11, 2020
**Received in revised form**
March 5, 2021
**Accepted**
April 14, 2021
**Available on-line**
June 30, 2021

***Highlights***

- *Comparison of face-to-face and emergency remote teaching in terms of student satisfaction and stress.*
- *Opportunities for interaction with teachers and classmates, class discussions, and mutual feedback were the face-to-face educational aspects most lacked by students in emergency remote teaching.*
- *Emergency remote teaching promoted the acquisition of various skills among students.*
- *Tolerance and solidarity among students and teachers in a time of crisis.*

## INTRODUCTION

Three weeks into the 2020 spring semester, Czech higher education institutions were confronted with an unprecedented challenge - to shift from face-to-face (F2F) to (emergency) remote teaching practically overnight. The government lockdown that was put into effect disrupted the usual routines but did not relieve most citizens of their job or study-related responsibilities. Educators were expected to continue delivering lessons, holding consultations, and carrying out assessment, while the students' "end of the bargain" was not to miss out on assignments, complete the semester on time, and most importantly, not to compromise the efficiency of their schoolwork.

The abrupt pivot from classroom to remote teaching held up a mirror to the long-standing practice of distance education. Noffsinger's (1926) thorough research into distance education outlines a systematic description of American correspondence study (Black, 2019), and highlights that it began as early as the 1840s. The decades that followed saw degrees being awarded for distance learning and college classes televised on public

channels (OnlineSchools.org, 2020). During the 1970s and 80s, the equality of distance and F2F education was still regarded as 'a preposterous idea' (Moore, 2019: 32), but in the late 20th century the various forms of distance education were fully exploited. Since then, courses now known as online learning, e-learning, or blended learning, have been gaining momentum. According to Leonnard (2019), university students' loyalty to their institution is significantly influenced by their satisfaction with the quality and efficiency of their online sites and platforms. Work of organizations such as Coursera (founded in 2012), which brings courses from top universities online for free and aims to reach millions of prospective students worldwide (Koller, 2012), only justifies the publication by The Ministry of Education, Youth and Sports (MEYS, MŠMT), which claims that most universities already work with an array of online tools, which makes them highly experienced in providing online education. That being said, regarding the COVID-19 related measures in higher education, MEYS warns that in the event of a sudden shift from F2F to distance learning, the approach to the system of education would require revision. Moreover, related processes such as communication, planning, and selection of appropriate methods and tools, need to be provided (MŠMT, 2020).

MEYS's appeal corresponds with Hodges et al. (2020), who differentiate between planned online learning and courses taught online in response to a crisis or disaster. To identify the latter, they suggest the term emergency remote teaching (ERT). This refers to the specific type of instruction delivered in crisis circumstances and has become an alternative term used by education researchers and practitioners in order to disambiguate it from quality and well-designed online education. ERT represents a temporary alteration of instructional delivery mode. It involves the use of remote teaching solutions that would otherwise be provided F2F and that will be restored when the emergency tapers off. Its central objective is to provide provisional and easily accessible instruction during an emergency or crisis. Bozkurt and Sharma (2020) emphasise that unlike distance courses, which are an optional form of education, emergency remote teaching is an obligation. Therefore, its educational content might be overshadowed by what students remember in terms of feelings during the difficult times. Hodges et al. (2020) further accentuate that the limited time available for the establishment of ERT may affect the quality of the courses (in a planned situation such courses frequently take months to be developed). Referring to the CIPP Evaluation Model by Stufflebeam and Zhang (2017), they propose that 'the urgency of ERT and all that will take to make it happen in a short time frame will be the most critical elements to evaluate during this crisis' (Hodges et al., 2020). They also add that the evaluation of institutions' ERT efforts should focus more on the context, input, and process aspects rather than the product itself (i.e. learning and whether or not or to what extent it occurred).

In search of an evaluation of our ERT efforts, the English department members created a questionnaire focusing on four major areas which proved to be the most discussed aspects of the stance taken towards ERT by both the students and the teachers throughout the ERT-defined semester. We inquired how satisfied the students were with the ERT mode for reasons we managed to collect in further sets of questions. These questions encouraged the respondents to comment on the comparison of face-to-face (F2F) vs. online learning experiences, perceived stress level during ERT, and acquisition of skills. The first Covid-19 lockdown in the Czech Republic saw acts of solidarity on countless fronts with education being one of them. Compelled by the sense of responsibility for the efficiency of our effort, we designed the survey to collect feedback on the department's application of ERT during the lockdown, and at the same time to offer the students a safe space to share their immediate reflections of their own role and participation in the unprecedented situation.

## THEORETICAL BACKGROUND

### Face-to-face vs. online experience

Regardless of the form of learning (F2F or online), its effectiveness is always supported by social interaction, i.e. instructor presence. Traditional F2F learning allows more student-teacher and/or student-student interaction than the online learning environment (where all parties are forced to use technology as a tool for interaction). Additionally, online interaction is often reduced to text (Ramsden, 2003). There are, however, features of online interaction that students perceive as essential indicators of the much sought-after instructor presence. These include comprehensible course requirements, prompt response to students' demands, and provision of timely feedback (Sheridan and Kelly, 2010). Minimal peer communication has an adverse impact on motivation and feelings of isolation (Hartnett, 2015). Therefore, instructors ought to establish and maintain online presence (Hartnett, 2019) and foster online learning communities by encouraging group discussions and peer interaction (Vayre and Vonthron, 2019).

An investigation into the expectations about the roles of students and teachers in online courses conducted by Bork and Rucks-Ahidiana (2013: 21) shows how important both the voice and eye contact between students and teachers is in helping them 'to feel a sense of connection to the instructor and the course'. The same research suggests that students' feeling of being taught actively stems from relevant, tailor-made course materials. The findings of Cleveland-Innes, Garrison and Vaughan (2019) indicate that social presence in online learning, i.e. in the environment of inquiry and shared purpose, contributes to discourse, enhanced productivity and learning outcomes.

The online pedagogy guide published by Harvard University (2020) mentions that within online learning, technologies can provide a more "lean forward" atmosphere and urges teachers to exploit this fact. Inasmuch as today's students are considered to be digital natives, it is advisable to present traditionally "lecture-based" courses remotely, i.e. online (Harvard University, 2020).

Conversely, there are critical voices that warn against a rapid spread of online learning. Their main concern is with the maintenance of quality of higher education. These critics also call attention to clinical work or fieldwork, which are difficult to

conduct with online tools. They emphasise the value of college experience outside of the curriculum - which is virtually non-existent in the online world (Shapiro et al., 2017).
At the same time, the proverbial digital native status of today's students has yet to be proved under university online learning circumstances. There is the technical aspect of studying and working online, which seems to be less of a problem for most students. However, critical thinking, giving unequivocal statements, organizing thoughts and ideas, and cooperation are among those skills which online students do not possess (Parkes, Stein and Reading, 2014).

## Satisfaction with online education

When expressing satisfaction or dissatisfaction with online learning, students tend to focus their assessment on the role and performance of the teacher. Bolliger and Martindale (2004) argue that the instructor is the chief predictor in student satisfaction, and they list several features of a teacher's performance that correlate with student satisfaction. These include the teacher's accessibility, flexibility, organizational skills, and the ability to be inspiring, encouraging and motivating. Students expect encouragement to make them active participants in the online learning process.
The psychology-grounded self-determination theory (SDT; Ryan and Deci, 2017) assumes that pupils and students are intrinsically motivated to learn and thrive academically. This intrinsic drive is accompanied by the psychological needs of achieving autonomy and a feeling of social belonging. Achievement-oriented motivation is at the centre of goal orientation and performance orientation theories. In relation to distance education, learning goal orientation has been found to enhance student participation in online discussions as well as overall course satisfaction (Hartnett, 2019).
Jindrová, Vostrá Vydrová and Dömeová's (2013) survey of students' satisfaction with e-learning courses gives evidence that low levels of students' self-discipline along with lack of motivation to do schoolwork correlate with high demand for e-support including swift feedback from teachers. The survey results also show that unmotivated students perceive the teachers as less qualified and they are critical of the overall quality of the course.
To perceive the online learning process as successful, students require systematic monitoring of their progress (Bolliger and Martindale, 2004). The instructor's feedback is a source of validation and confirmation of both the students' work and their identity. Students in online courses need identity validation, because limited opportunities to develop relationships can lead to feelings of isolation and invisibility. Online communication is often perceived as less personal, i.e. dissatisfying, thus creating a socializing interaction proves to be essential for student satisfaction (Allen et al., 2019).
The lack of teacher social presence and immediate feedback can trigger computer-mediated communication anxiety (CMCA), which can, conversely, influence learners' perceptions of instructor credibility, online teaching presence, and learning outcomes (Wombacher et al., 2017). Additionally, students expect to be informed on their progress and 'they like to contextualize what they are learning by applying the information in real life' (Ally, 2008: 29). Practice activities simulating real-life situations, which are included in online learning materials, determine relevance and perceived value of these materials. Feedback, which the practice activities provide, helps students to review their learning method and make appropriate corrections (Ally, 2008).
Further, teacher's positive and open approach to the IT aspect of online learning influences the students' results and subsequently their satisfaction. However, what contributes to student satisfaction most significantly are features of online education such as well-prepared teaching materials, suitable online discussion arrangements, course design, scheduling and instructional expertise (Sun et al., 2008). Kuo et al. (2013) also list learner-instructor interaction, learner-content interaction, and Internet self-efficacy as credible indicators of student satisfaction.

## Online vs. face-to-face: stress, anxiety, frustration

Several studies (e.g. Saadé and Kira, 2009; Sun, 2014; Shapiro et al., 2017) suggest that approximately one third of learners experience some level of anxiety or unease in relation to online learning or perceive their learning during an online course as less effective compared to the traditional classroom model (Muilenburg and Berge, 2005; Wombacher et al., 2017). While low levels of stress or anxiety may stimulate motivation and performance, high levels have a negative impact on motivation, engagement levels and academic achievement (Heckel and Ringeisen, 2019).
High task assessment weight in relation to the overall course mark is a major stressor and inhibitor in online courses (Hartnett, 2015). Korpi (2019) argues that stress and frustration caused by high-stake assessment can be significantly reduced by multiple, low-stake iterative assessment and targeted feedback. Iterative assessment and instructor feedback review increase student engagement and enhance the capability of self-reflection.
Misalignment of student and instructor expectations and the consequent role ambiguity are other potential sources of tension and frustration (Bork and Rucks-Ahidiana, 2013). The absence of the usual socialization process that occurs in the traditional classroom requires respective role shifts; instructors must also become learning and communication facilitators, whilst learners must increase their own activity in acquiring knowledge (ibid.) and accept greater responsibility for the learning process and outcome. Following Bork and Rucks-Ahidiana's survey (2013), the main areas where instructor expectations about online students are misaligned with the students' perceptions and expectations are technological preparedness, learning management skills, and help-seeking behaviour. For example, while instructors expect intrinsic motivation and self-regulation, students expect to be encouraged and motivated by instructors and to receive more guidance with task and content prioritization and complying with coursework requirements. Student expectations reported as mismatched concerned instructor communication habits, substantive feedback and online presence and pedagogy.
According to Vayre and Vonthron (2019), the lack of instructor

presence, interaction and immediate feedback as well as the insufficient interaction with the class may lead to feelings of disconnection and frustration, and eventually to failures. Their study demonstrates that the feeling of community, belonging and connectedness has a positive impact on academic self-efficacy, which is a major factor in student engagement and success in online courses. Students with higher online learning self-efficacy feel that they are in greater control of the learning process and experience lower levels of anxiety and higher levels of pride (Heckel and Ringeisen, 2019). On the other hand, low levels of anxiety correlate with higher course satisfaction.

Online learning self-efficacy, associated with the use of ICT technologies and learning management systems (LMS), depends on computer self-efficacy and previous online learning experience (Saadé et al., 2017). A survey performed by Saadé et al. (2017) showed that approximately 30% of students feel some sort of anxiety in respect to online courses. Saadé and Kira (2009) argue that technology-related anxiety has a negative influence on the perceived ease of use of LMS, academic self-confidence, general stress and anxiety levels, and, consequently, the overall course performance and satisfaction. The occurrence of computer anxiety is linked to the growing value of e-learning as well as the continuously rising complexity and integration of interfaces. Other potential technology-related obstacles in online learning include asynchronous communication (Hartnett, 2019), becoming easily distracted, and difficulties in managing the great amount of information available online (Newman and Beetham, 2017). Many of the potential stressors and anxiety triggers recognized in scheduled online teaching apply to emergency remote teaching (ERT). They include the loss of both teacher and student social presence, disruption of synchronicity, and instability of expectations (Whittle et al., 2020). Student stress and anxiety can be prevented or alleviated by a proactive instructor approach which is centred on clarity of instruction and communication, considerate workload control, as well as flexible, lower-stake assessment (Quintana and Quintana, 2020).

Most participants in a large-scale survey in China reported that the continuation of classes online had helped them manage mental stress caused by the COVID-19 quarantine (Sun, Tang, and Zuo, 2020). In response to the current pandemic experience, Gross (2020) argues that the online learning environment can, and ought to be, trauma-responsive and help students and staff deal with anxiety or traumatic states provoked by health concerns, school closures, social and emotional isolation, etc. Suggested strategies that can promote student engagement and success include facilitating personal interaction, making the visual message in video meetings interesting and encouraging, including engaging "non-academic" exercises, and trying new approaches and methods enabled by online settings.

## Motivation and skills development

Student motivation is one of the most significant factors that influence academic achievement. It determines students' choices and actions and is thus responsible for the level of engagement in educational activities (Wentzel and Brophy, 2014). According to the expectancy-value theory (EVT; Eccles and Wigfield, 2002), motivation is primarily sustained by the belief in one's competence and expectancy for success, and the perception of value and relative costs in relation to specific tasks. The perceived value of tasks depends most notably on their attainment and utility values in relation to students' interests and goals (Jindrová, Vostrá Vydrová and Dömeová, 2013; Hartnett, 2019).

Interest theories (Schiefele, 1991, 1999; Hidi and Harackiewicz, 2000) distinguish between individual and situational interests. While individual interest is viewed as a relatively stable aspect of personal characteristic, situational interest is generated by environmental factors that attract students' attention to specific learning contents and activities. Situational interest appears particularly beneficial in students with low levels of academic motivation (Hidi and Harackiewicz, 2000). Hidi and Renninger (2006) conceptualize interest development as a four-phase process by differentiating emerging and well-developed individual interests and triggered and maintained situational interests. Triggered situational interest, generated through novelty or originality, is the temporary first phase that can develop into maintained situational interest. These two stages are pre-conditions of emerging and, eventually, well-developed individual interests.

The belief of students in their ability to perform adequately in educational contexts is at the centre of the self-efficacy theories. Self-efficacy is ranked among the key factors that influence learning behaviour and academic achievement (Schunk, 1989) and has been used as a predictor of students' motivation and learning (Zimmerman, 2000). The levels of self-efficacy are determined, among other things, by appropriate goal setting and instruction, as well as the provision of attributional and performance feedback. Students with high self-efficacy are less prone to experience frustration, stress and anxiety (Schunk, 1989). They also demonstrate strong self-regulatory abilities such as goal setting, self-monitoring, and self-evaluation (Zimmerman, 2000).

Student motivation is a key factor that affects learner persistence and success in online education (Hartnett, 2015). In Muilenburg and Berge's survey (2005), learner motivation is reported to be the second most urgent barrier to online learning. As mentioned above, not all students are able to gain from the benefits of asynchronous learning, such as spatial and temporal flexibility (also Hartnett, 2015; Vanslambrouck et al., 2018). A mixed SDT & EVT-based study by Vanslambrouck et al. (2018) suggests that on its own the online environment has a fairly low impact on intrinsic and attainment values. This means that the online form itself does not significantly increase personal enjoyment and boost self-esteem. On the other hand, the utility value, i.e. the practical benefits and outcomes in relation to particular goals and ambitions appears to be the main asset. This includes not only reaching educational goals but also developing additional skills such as IT competencies, time management, and self-regulated work. Sun's survey (2014) revealed that students appreciated improvements in independent learning strategies, such as planning and monitoring course activities and seeking feedback when necessary. They also reported progress in their real-life problem-solving skills.

Considering that peer interaction restrictions are perceived as a major barrier to online learning, it is interesting to see that e-learning can also enhance certain social skills. Specifically, teaming up online and collaboration in small groups prove fruitful as they foster new communication and interaction skills (Sun, 2014). Self-regulated online learning also provides opportunities for developing self-assessment and critical reflection skills (Conrad and Openo, 2018). Clear, structured support, including cognitive scaffolding and balanced teacher presence, is, nevertheless, necessary in order to prevent feelings of uncertainty and frustration (Stavredes and Herder, 2019). Bork and Rucks-Ahidiana's study (2013) confirms that while most students accept greater responsibility when learning online compared to classroom settings, they expect instructor guidance and help. It also suggests that students who take responsibility for their learning are more proactive in terms of reflection, self-evaluation, and seeking feedback. Effective self-assessment tools include reflective records, such as logs or journals, or feedback essays and questionnaires (Conrad and Openo, 2018). The costs, i.e. negative aspects of distance learning, include excessive workload and technological issues, particularly computer skills and ICT equipment. Online interaction and organizing group work are also experienced as problematic by some students (Vanslambrouck et al., 2018). Nonetheless, most surveys reviewed in this paper present online learning, including the recent ERT cases, as a generally positive experience.

## MATERIALS AND METHODS

The presented research is an ex-post facto case study which aims to examine university students' experiences and perceptions related to the sudden shift from F2F to ERT mode of instruction during the first COVID-19 lockdown. Hypotheses are not proposed within this research design as it focuses on the examination and description of previously unexplored phenomena brought about by the consequences of the COVID-19 pandemic in tertiary education. The research questions were formulated on the basis of observations and concerns collected by the faculty. Several hypotheses which emerged as a result of our findings will be suggested in the discussion section as possibilities for further research and investigation.

The research was carried out at the University of South Bohemia, a medium-sized Czech public university, one of the numerous educational institutions worldwide that was obliged to cancel all F2F classes for ten weeks (March – May 2020) in response to the COVID-19 restrictions and resort to ERT to maintain the continuity of instruction. Although none of the members of the English department of the Faculty of Education had actively created or conducted online courses, without firm guidelines each instructor employed traditional as well as modern electronic tools to deliver the content, but most importantly to assure the students that the semester continues with active participation of all stakeholders. The feeling of being under an undefined obligation was prevalent in the first weeks of the lockdown. At home and at school, most students found themselves expecting clear directions "from day one", but instead they had to learn to adapt to change.

The unprecedented teaching experience prompted the department members to conduct an evaluation of its ERT efforts. Their interests centred around the students' attitudes, perceptions, and experiences with the contingency measures applied in their English language study programme and induced the following input and process-related evaluation questions:

1. What factors affected university students' satisfaction or dissatisfaction with ERT?
2. How did the ERT experience compare with face-to-face learning?
3. How stressful for university students was ERT compared with face-to-face learning?
4. Did the ERT situation impact the students' acquisition of language and other skills?

A questionnaire entitled *Students of English reflecting on their emergency remote teaching* was created by the English department and distributed among all its students immediately after ERT termination at the end of May 2020. It was introduced by a personal letter from the head of the department explaining its constructive purpose in improving the quality of the department's work. Students were also informed of the confidential nature of the questionnaire. The main aim of the questionnaire was to collect information on and evaluate how students perceived the unparalleled academic experience, namely in terms of their satisfaction or dissatisfaction with various aspects of online learning as implemented by the English department in the spring semester of 2020 in response to the COVID-19 pandemic situation (input evaluation). The motivation to inquire about satisfaction stemmed from the provisional nature of ERT, which, as we gathered from students' indications during less formal parts of lessons or during consultations, was perceived both positively and negatively. In addition, it explored three further process evaluation issues: the differences they experienced by having to learn online as opposed to F2F instruction, the stress level the students underwent, and the skills they acquired during the three months of involuntary and unplanned distance learning.

The questionnaire consisted of fifteen questions. The first two questions identified the students' status (degree programme and year of study). Five questions were closed and required respondents to provide answers on a scale or select from given options. Four questions were open, inviting the respondents to express themselves at liberty and make personal comments related to the areas of interest (see Table 1 below).

The remaining four questions included in the questionnaire provided feedback related to specific subjects at the department and were not included in our analysis.

A total of 99 respondents, 68 Bachelor's and 31 Master's degree students training to become primary or lower-secondary English foreign language teachers, voluntarily completed the online, anonymous questionnaire using Microsoft Forms.

The main limitations of our study are its narrow and heterogeneous sample of respondents and the feedback-driven formulation of questions, which make the use of statistical validation methods inapplicable or irrelevant.

| | Closed questions scale/options | Open questions |
|---|---|---|
| Satisfaction | **How satisfied were you with ERT instruction at the English department?** | What were your reasons for feeling satisfaction and/or dissatisfaction? |
| | 1 = dissatisfied 2 = fairly satisfied 3 = satisfied 4 = very satisfied 5 = fully satisfied | |
| F2F vs. online | Which aspects of F2F instruction did you lack during ERT? | Explain which aspects of your ERT experience you consider suitable or unsuitable for potentially incorporating into F2F instruction. |
| | contact with instructors, contact with peers, mutual discussion, feedback from instructors and peers, comparison with others | |
| Stress level | **How stressful did you find ERT in comparison with F2F?** | What did you find stressful during the ERT period? |
| | absolutely not - partly - equally - more - significantly more | |
| Skills development | How did your English language skills change during ERT? | Did you acquire any other skills not necessarily related to your field of study? |
| | improved – did not change – became worse | |
| | **Which activities did you undertake to develop your language skills over the ERT period?** | |
| | listening to the news, watching TV, watching films and shows, playing video games, chatting with friends, reading newspapers or online articles, reading books, other | |

**Table 1: Four areas of evaluation and the corresponding closed and open questions under analysis**

# RESULTS

## Satisfaction

Respondents indicated the degree of their satisfaction with ERT on a scale from 1 (substandard) to 5 (excellent). The average overall score was 4.07 (4.11 in the BA and 3.97 in the MA programme). In their comments, they specified their answers and the most reported reasons for satisfaction were:

- quality of communication and proactive approach of the instructor
- regularity, clarity and good organization of instruction
- adequate number of assignments, sufficient time for their completion, reasonable adjustment of requirements when necessary
- prompt response from the instructor and the provision of quality feedback.

Numerous students noticed and appreciated that some instructors were extremely flexible and capable of reorganizing their courses quickly to accommodate to the new conditions and limitations. They carried on with class work and enabled regular online communication and consultations. Moreover, they were willing to make certain concessions regarding assignments and testing and announced their deadlines and test/exam dates well in advance. In certain subjects, students even felt that "instruction was close to what it is like in regular lessons." Regular assignments considerably helped certain students with their time management in the emergency period and boosted their morale. One respondent appreciated that she was even able to complete her teaching practice during the ERT by participating in the elementary school's ERT.

A certain degree of dissatisfaction related to a specific subject and its instructor was expressed by one third of respondents. Open answers revealed that the main factors for dissatisfaction included unclear instructions and absence of prompt or sufficient feedback. Although the students understood the emergency circumstances and generally tried to adapt to them, they described certain measures such as limited or no interaction with peers as inevitable but dissatisfactory. Students were also critical of the occasions when online instruction started much later than expected, or when there were only weekly tasks and/or assignments but no actual online instruction. Only one respondent's explanation was linked to their fear of passing a test.

## Face-to-face vs. online

Respondents were asked to rate to what extent they lacked five aspects of F2F education in their ERT. Figure 1 reveals that the answers were very similar in terms of contact with faculty members, contact with fellow students, participating in discussions, and receiving immediate feedback from instructors and fellow students. More than 80% of students stated that during ERT they significantly or partly missed opportunities for interaction with teachers and classmates, class discussions, and mutual feedback. On the other hand, the one aspect that was missed by only 14% of students was comparing with others. The majority of students (61.6%) did not miss comparing with others at all and 24.2% lacked comparing with others partly during distance teaching.

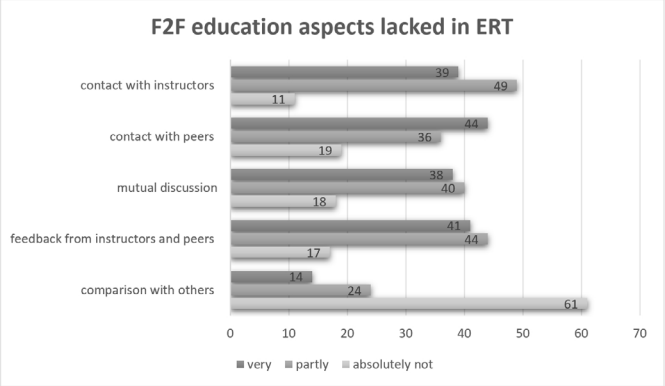


**Figure 1: F2F education aspects lacked in ERT.**

Additionally, respondents could explain which aspects of online instruction they considered most and least convenient and/or which aspects could or should not be incorporated into

the study programme. Online instruction was found to be more effective in terms of time management by thirteen respondents as "time is not wasted by travel" and "more time can be devoted to the completion of assignments". Twenty-four suggested that in certain courses, namely the more theoretically based ones such as literature or history, lectures could be delivered online even when the situation returns to normal. Seven indicated that the online lectures during ERT were surprisingly interesting and practical in that students could listen to them repeatedly and devote more time to fully grasping the content. Four respondents maintained that online instruction was generally unsuitable for foreign languages and the same number believed that most subjects in a foreign language programme could to a certain extent be taught online. Three students stated that studying online encouraged them to do more research and further reading. On the contrary, online teaching was labelled as completely or largely unsuited to the teaching of speaking skills and/or pronunciation by more than half of the respondents, even though one also admitted that "where there is a will, there is a way." Also, fourteen respondents recognized linguistics and phonetics as inappropriate for online instruction – as these skills are considered highly demanding and require thorough in-class discussion.

## Stress level

Figure 2 shows that almost two thirds of the participants found ERT absolutely or quite acceptable, about one fifth considered it to be equally stressful as F2F teaching, and one fifth viewed it more or much more stressful than F2F classroom interaction.

Further comments revealed that in terms of stress level, a number of respondents appreciated learning at their own pace, at their preferred time of the day, often in the comfort of their homes ("you can wear your pyjamas, lie on your bed, eat or drink, and no one minds"), which was regarded as less stressful than working at school. As one respondent put it, "I generally found learning online positive. One can fully focus without being disrupted by the surroundings." Students also reported that they were able to concentrate better on the content of lectures delivered online or posted as videos because in the F2F format lectures "sometimes tend to be very noisy with classrooms full of students."

On the other hand, some students perceived the use of different communication platforms by different instructors across the courses as extremely chaotic and stressful. One student also suggested that "there should be clear guidelines for similar situations."

As the respondents were both BA and MA students, one of the objectives was to test if the degree programme impacts the perceived stressfulness. The chi-square test was used to test the null hypothesis, i.e. there is no significant difference between BA and MA students in their evaluation of stressfulness. See Table 2 for the gathered data – the brackets contain the expected frequency.

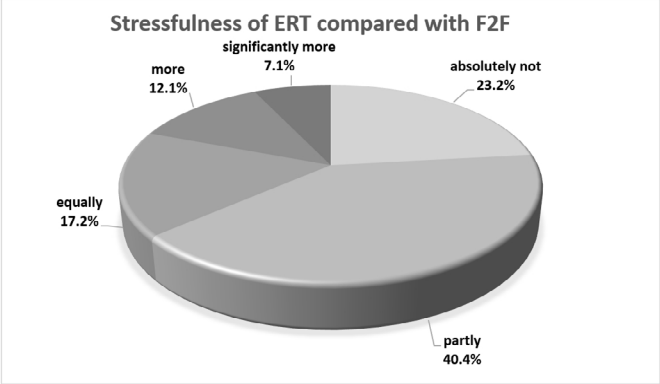


**Figure 2: Stressfulness of ERT compared with F2F.**

| | absolutely not | partly | equally | more | significantly more | total |
|---|---|---|---|---|---|---|
| BA | 18 (15.8) | 24 (27.5) | 10 (11.7) | 11 (8.2) | 5 (4.8) | 68 |
| MA | 5 (7.2) | 16 (12.5) | 7 (5.3) | 1 (3.8) | 2 (2.2) | 31 |
| total | 23 | 40 | 17 | 12 | 7 | 99 |

**Table 2: Stressfulness of ERT compared with F2F – BA vs. MA students**

The chi-square test shows that the degree programme is, indeed, statistically not significant for the stress level evaluation ($x^2 = 6.26$, $df = 4$, $p = 0.1819$).

## Skills development

The participants were asked to subjectively assess whether their English language skills had changed over the three-month ERT period. 68 did not report any significant difference in their language skills, 24 noticed improvement, and 7 felt that their language skills had deteriorated.

All respondents made some effort to improve their language skills in their leisure time. The most popular activities were watching films and TV series (93), reading newspapers and online articles (58), and reading books (55). They also engaged in communicating with friends in English (38), listening to the news (25), playing video games (23), and watching television (see Figure 3). In the open answers, six respondents reported

that they had been able to explore their topics in greater depth or that their school assignments submitted during online learning had been of much higher quality than during regular classes as they had more time for their completion. Two highlighted the new opportunity to devote time to developing the language skills of their choice.

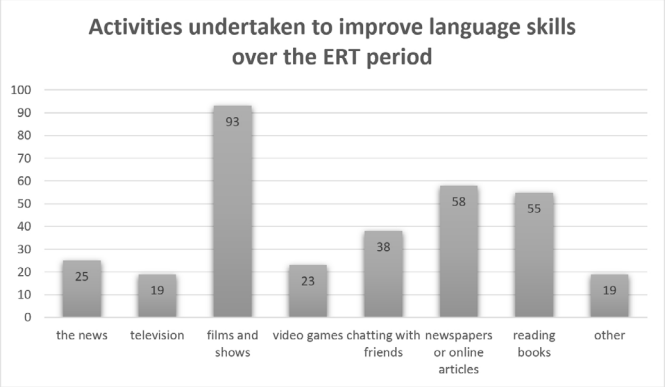


**Figure 3: Activities undertaken to improve language skills over the ERT period.**

Other reported ways of enhancing respondents' foreign language skills included reading specialized/scientific books, tutoring, vocabulary practice using the *Duolingo* app, listening to podcasts, and translating. The open answers revealed that the emergency also positively influenced the students' acquisition of other skills, namely:

1. gaining more competence, confidence, and flexibility in the use of technologies (25 respondents)
2. improving time management and organizational skills (25 respondents)
3. becoming more independent and autonomous (23 respondents)
4. becoming more effective in working with various resources and/or specialized literature (11 respondents)
5. gaining new teaching skills (2 respondents)
6. learning a new language (1 respondent)

Only 11 respondents indicated that they had not developed or improved in any other skills or did not know how to answer the question.

The comparison of BA and MA students in Table 3 indicates that the acquisition of technological skills was reported by more than a third of all the MA students (38.7%). We will return to the potential explanation of this phenomenon in the discussion.

| | technological skills | time management | independence |
|---|---|---|---|
| BA | 13 (19.1%) | 19 (27.9%) | 15 (22.1%) |
| MA | 12 (38.7%) | 6 (19.4%) | 8 (25.8%) |
| total | 25 (25.3%) | 25 (25.3%) | 23 (23.2%) |

**Table 3: Skill acquisition during ERT – BA vs. MA**

## DISCUSSION

As mentioned earlier in this paper, the current generation of students are generally regarded as digital natives not only by the instructors, but also by themselves. The ERT pivot put this assumption to the test and the responses available show that 25.3% of the students believe to have improved their IT skills over the duration of ERT. It follows from this finding that online teaching, regardless of the course content, has the potential to further develop overall digital competence, which is gradually becoming an integral part of our skillset. The implication is that we need to be careful when making generalisations about students' digital skills, because many of them may not be as well equipped for online learning as we would like to believe. This finding correlates with Bork and Ruck-Ahidiana's (2013) identification of technological competence as one of the main points of misalignment between students' and teachers' assumptions and expectations in online education. The logical course of action is to implement more IT-based tasks into standard teaching and provide necessary support in the form of further training in technological competence.

Since the digital environment suddenly became the main hub, the responsibilities of students in this new setting became less clear – this may lead to higher levels of anxiety. Consequently, students had to re-evaluate their role during the pivot, and their responses showed that they sought guidance in the form of instruction, timely and relevant feedback, and encouragement. The instructors had been expected to take on greater responsibility for facilitating discussion and involvement of the students. One of the respondents reported that the lack of online (real-time) seminars in a particular subject resulted in the instructor having "not enough leverage to make students work if they do not want to." Other respondents mentioned in their comments that they had been waiting for the instructors to find a way to engage them due to the lack of guidelines for such a situation. As Lehman and Conceicao (2010: 28) explain, instructors become designers of the online experience for students. The formal position of authority of the instructor remains, but there is also a new role of moderator in the online environment, which is crucial for the online learning to be successful (cf. Sun, 2011, 2014; Martin, Wang and Sadaf, 2018; Stavredes and Herder, 2019).

The ability of the instructor to adapt to this shift of responsibility from student to teacher was another key factor in determining the overall satisfaction with ERT. Conversely, the lack of doing so reportedly resulted in dissatisfaction and additional stress as the students were left to determine their responsibilities on their own. In our questionnaire, five students reported frustration with different instructors using various platforms and/or not providing clear instruction related to course completion. While it is understandable that each instructor might prefer working with a certain platform based on their previous experience, the inconsistency remains a negative factor in ERT and should be subjected to revision (cf. Sun, 2011). Additionally, we believe that providing clear instructions is essential for any non-standard mode of education and the students need to receive these instructions promptly.

Next, we would like to comment on 61.6% of the students not missing the comparison with others. This was one of the seemingly surprising findings that has important implications –

especially for teachers who use relative grading (also referred to as marking on the curve, grading on a curve, bell curving, etc.). While social interaction among students is widely regarded as indispensable for effective education (e.g. Hurst, 2013; Sun, 2011) and the comparison to others is likely to occur individually, it may become an inhibiting factor in F2F education due to its stress potential (cf. Buunk and Gibbons, 2005; White et al., 2006; Civitci and Civitci, 2015). There seem to be limited benefits to using comparison with others as our results suggest that students do not respond well to such form of encouragement (cf. Civitci and Civitci, 2015).

As much as ERT is essentially a contingency measure and most of the students would still prefer F2F education, 25.3% of the students mentioned in their responses the flexibility of time management and work organisation as a beneficial aspect of ERT. While there were several scheduled online classes that the students were expected to attend, they welcomed the possibility of recording the online sessions and the opportunity to return to them at their own convenience. 10.1% of the students explicitly stated that they would prefer lectures to be carried out online regardless of ERT. Additionally, when asked about the suitability of respective areas of language study for online learning, 49.5% of the students considered literature courses to be at least partially suitable, followed by linguistics (18.2%), practical language (16.2%) and methodology (10.1%). The results reflect the standard nature of these areas. Reading assignments do not require interaction, whereas methodology often involves interaction-based tasks. Linguistics is commonly considered difficult by students and some of the respondents mentioned that linguistic issues require thorough in-class explanation and/or discussion to be properly understood. Practical language lessons comprise communicative exercises that often involve multiple speakers, which is difficult to achieve in online spoken communication. Consequently, 37.4% of the students reported that, unless necessary, no area is suitable for the shift to online learning. ERT provided the students with more responsibility for their time management, which was received positively as time flexibility and the non-stop availability of online course material is considered to be one of the most appreciated advantages of online learning (e.g. Allen et al., 2019).

Regarding the student satisfaction with ERT, the collected answers indicate that one of the most important evaluation aspects was the lack of preparedness. Both the students and the instructors were forced to navigate uncharted territory and adapt to unprecedented circumstances. The teachers had to shift to a different mode of instruction at short notice, without firm guidelines or schedules available. The students recognised the difficulty of the situation and exhibited high tolerance and solidarity. This resulted in little to no expectations on the side of the students regarding the entire process, which in turn contributed to the assessment of ERT being overwhelmingly positive. Reynold and Chu (2020) argue that nobody could have been prepared for the (overnight) transition to ERT, which resulted in promptness of response to the situation becoming the major factor affecting satisfaction. Additionally, the students valued those modes of instruction that supplied experience similar or almost identical to standard teaching. This is inevitably tied to the external factors associated with the quarantine measures that brought a sudden change to even the most basic aspects of our lives. We believe that well-crafted ERT may have provided at least some form of what the students considered familiar and, therefore, possibly also comforting (cf. Sun, Tang and Zuo, 2020). According to our findings, more than 80% of the students missed the F2F interaction, which is in agreement with multiple other studies (e.g. Cole, Shelley and Swartz, 2014; Horzum, 2015; Graham, 2019) as online education lacks synchronicity by design. It follows that providing enough stimuli for recreation of F2F engagement leads to higher satisfaction. In addition to encouraging active participation in online spoken discussions, we should aim to utilise other methods of engagement in the online environment, e.g. forums, community hubs, social media, etc., that can contribute to the overall feeling of connectedness.

Next, we want to discuss the question of language skills development during ERT, as it is, after all, our primary area of focus. The majority of the students (68.7%) reported no change to their skills, 24.2% improvement, and 7.1% deterioration. The "no-change" self-assessment can be attributed to the shortness of the ERT period; three months is a limited amount of time for any significant development to be recognized. Improvement is possibly caused by the increased exposure to the target language, which is considered more effective than guided learning (e.g. Krashen, 1988). Deterioration can be the result of the students not having the opportunity to use the language actively over the period of ERT. Nevertheless, the responses may not be an accurate representation of the real changes to the students' language skills as they remain a subjective assessment.

We would also like to comment on the comparison of the responses of BA and MA students. Firstly, there is no significant difference in the evaluation of overall satisfaction. The reason for this is likely the tolerance and solidarity that has been discussed earlier, which does not seem to be related to the degree programme in any way. In regard to the stressfulness evaluation, the more experienced students (MA) were expected to report lower levels of stress. However, the chi-square test revealed that there is no (statistically) significant difference between BA and MA students in relation to stress. Lastly, a comparison was done for the three most frequently listed skills that the respondents believe to have acquired during ERT – namely technological skills, time management, and independence. While time management and independence were more or less evenly distributed between BA and MA students (less than 5% deviation from the mean), technological skills showed a significant deviation of 13.4% for MA students. One reason might be the age difference; younger students are likely to be more tech-oriented in the increasingly digitalized world. Ultimately, it is important to note that our dataset is rather limited for providing conclusive answers related to differences in evaluation between BA and MA students, therefore, we refrain from making any generalizations.

Finally, based on the results of our investigation, we present the following hypotheses as areas for further research into the understanding of the student perception of online learning:

1. An abundance of asynchronous learning leads to higher levels of stress.
2. Regular provision of feedback correlates with student satisfaction.

We recognize these phenomena as deserving of thorough measurement with the use of valid and reliable surveys.

## CONCLUSION

The purpose of this paper has been to share the feedback we received from the students regarding the quality of ERT that took place over three months. The abruptness of the ERT pivot did not allow for much preparation prior to the shift to online teaching and we had to react to the situation – no matter how unprepared. However, there is already an abundance of theory and methodology dedicated to online education, which may, in retrospect, help us understand the entire process and provide the much necessary groundwork for future improvement. Together with the gathered feedback, we have had the chance to critically assess the ERT experience and learn what aspects and factors were considered efficient, but also inefficient.

We believe it is important to emphasize that prior to this emergency, our experience with online teaching was very limited. Fortunately, the whole situation was supported by a reciprocal wave of tolerance and solidarity. We are, nevertheless, aware of the fact that should a similar situation arise again in the future, the "grace period" is over and it is our responsibility to be adequately prepared, both as teachers and students. The positive feedback might serve as encouragement and also help us with the development of proper guidelines for another such emergency. What is more, some aspects of ERT can be integrated into standard teaching now that some of the possibilities have been collectively explored. After all, we live in an era of digitalization, and while certain aspects of education might not be suitable for online learning, adopting a hybrid approach is inevitable. We firmly believe that this experience should not be dismissed as a one-off incident. It should rather serve as a cathartic moment and, whether we are teachers or students, invite us to rethink our approach to education.

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*Full research paper*

# PROMOTING EFFECTS OF ABILITIES WHILE ENHANCING PROBABILITY OF COLLEGE-SUCCESS: A MODERATION ROLE OF HIGHER EDUCATION

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## ABSTRACT

Studies revealed that college readiness promotes college success and higher education student learning outcomes. This study opted to 1) analyze the total effect and the conditional effect of college readiness on college success by university generations and departments; 2) analyze the differences in the probability of college success across departments and university generations; 3) describe the quality of university generations in terms of the conditional effects and the probabilities of college success. The study is an ex post facto research. The Ethiopian 1st, 2nd, and 3rd generation universities; and the National Educational Assessments and Evaluations Agency officers were the population of the study. The total sample size was 551. The Ethiopian General Education School Leaving Certificate Examination Grade Point Average, the Ethiopian Higher Education Entrance Examination score, and the College Cumulative Grade Point Average of the students were sources of the data. Using the Process Procedure for Software Package for Social Sciences, the binomial logistic regression was conducted. Maintaining the highest total conditional effect of college readiness on college success while heightening the probability of college success at a value of college readiness has been interpreted as a trait of the high performing university generation.

## KEYWORDS

**College readiness, college success, higher education quality**

## HOW TO CITE

Wariyo L., Asgedom A. (2021) 'Promoting Effects of Abilities While Enhancing Probability of College-Success: A Moderation Role of Higher Education', *Journal on Efficiency and Responsibility in Education and Science*, vol. 14, no. 2, pp. 101-117. http://dx.doi.org/10.7160/eriesj.2021.140204

**Article history**
**Received**
September 11, 2020
**Received in revised form**
March 15, 2021
**Accepted**
May 12, 2021
**Available on-line**
June 30, 2021

***Highlights***

- *College readiness affects college success.*
- *The conditional effect of college readiness on college success varies by university generations and departments.*
- *The probability of college success at the value of college readiness varies by university generations and departments.*
- *Maintaining the effect of college readiness on college success while heightening the probability of college success is a trait of high-performing university generations.*

## INTRODUCTION

College-ready students are more prepared for postsecondary education and expectations, as well as for workforce, social, and political responsibilities than less college-ready students (Mokher and Leeds, 2019). One of the strong determinants of college outcomes is the development of pre-college academic skills and readiness (Fina, Dunbar and Welch, 2018; Jackson and Kurlaender, 2014; Olani, 2017). Because of their unpreparedness for college-level learning, many college entering students are assigned to non-credit-bearing remedial education (Leeds and Mokher, 2019; Kallison, 2017; Relles, 2016). For these reasons, the college readiness factor is one of the most important issues ever discussed in educational research. College readiness is a dynamic term that is highly affected by time and space. The definitions may follow the changes in philosophies, aims, and objectives of global education and country-specific education (Klarin, 2016). For instance, the post-COVID 19 definitions of college readiness and success are having another shape. The average definition of college readiness is the maturity level of the students for college-level learning and expectations. Maturity level in a sense may show differences from place to place and from time to time.

Indicators of college readiness are course-taking, high school Grade Point Average (GPA), college entrance GPA, class rank, and Scholastic Aptitude Tests (SAT). Also, assignment to remediation, degree completion, time to degree, and cumulative college GPA have been discussed as the major indicators of college success (Hsieh, 2019; Davidson, 2015; Tucker and McKnight, 2019; Leeds and Mokher, 2019; Gaertner and McClarty, 2015; Kemple, Segeritz and Stephenson, 2013; Rasinski et.al, 2017; Balfanz and Byrnes, 2019). The current criticisms state that standardized measures of college readiness, such as the SAT and Program for International Student Assessment (PISA) are externally imposed, traditional, and they do not represent the local classroom learning and culture of learners (González Canché, 2019; Kim and Sunderman, 2005). These tests bias for high socio-economic families, and gender (Rattani, 2016; Saygin, 2020). Additionally, scholars state that the number of courses taken may not guarantee college readiness if they are not rigorously mastered (Callahan and Hopkins, 2017; Nagle et al, 2016; Wang, 2017).

On the other hand, college readiness is not fully the function of academic performance (Gray, Mcguinness and Owende, 2016; Savitz-Romer and Rowan-Kenyon, 2020). The non-cognitive factors, such as time management, finance, social integration, satisfaction with the institutional environment, perseverance, conscientiousness, motivation, goal-setting, help-seeking, self-advocacy, self-efficacy, critical thinking and reasoning, and college knowledge share the largest variance in college success than academic factors (Cho and Serrano, 2020; Tierney and Duncheon, 2015; Fennie et al, 2020). Despite the criticisms on them, utilization of the academic college readiness measures for college admission and placement decisions is very high compared to other measures. Academic preparation is the most determinant of college completion (Means et al, 2016). Also, a recent standards approach to curriculum design and standards-based test development increased the validity and the reliability of academic measures (Lunceford, Sondergeld and Stretavski, 2017; Hughes, 2006). The factors, such as the nature of the curriculum, the content, and the format of these academic measures highly determine academic measures' validity and reliability in measuring college readiness.

The studies and trends around the world took to the forefront the issue of consolidating and heightening the standards and quality of college readiness as one of the mechanisms to improve the quality of higher education (HE) outcomes. The reforms in terms of curriculum development, implementation, and assessment standards are the major academic approaches in building college readiness. Additionally, the more recent approach to HE quality assessment is taking into account these college readiness standards as a baseline in estimating the contributions of higher education institutions (HEIs) to student learning.

Although multiple factors widened the gaps between theory and practice, the Ethiopian Ministry of Education (MOE) (2009) has made reforms in terms of curriculum revisions to maintain the standards through the curriculum, especially in the form of shifting to competency-based curriculum development. The college readiness is realized when the written curriculum is rigorously practiced and integrated with the life world of learners throughout k-12 education. The validity and reliability of assessments also facilitate and monitor the effectiveness of student learning and they are the tools of assuring meritocracy and quality in student learning.

Regarding this, National Educational Assessments and Evaluations Agency (NEAEA) officer was interviewed to study the processes in determining cutting scores for the Ethiopian HE entry, and the test development processes. The interview result showed that college entry cutting score determination for different groups of applicants is dependent on the resource availability and the capacities of the universities. Taking the contextual factors into consideration as a good approach, however, the decision process failed to consider some scientific processes that are followed in different parts of the world. For instance, the yearly continuous studies that relate the cutting scores of the affirmative action groups and their college performances should have been used as additional information to make the decisions.

Also, an interview response from an Ethiopian Higher Education Relevance and Quality Assurance (HERQA) officer revealed that the Ethiopian quality assessment system did not consider the college readiness factors of the students as a covariate in assessing the performances of the HEIs. The current Ethiopian HE quality assessment system gives less attention to the direct assessment of HE learning outcomes (Wariyo, 2020). The research designs that take into account the contribution of college readiness need to guide the decision-making process in placement, admission, and HE quality assessment process. Furthermore, a comparative analysis of conditional effects of college readiness on college success at values of universities and fields of studies is important to study how the abilities of students are linked across universities and departments.

Student college readiness levels for college learning and expectation is one of the major factors that affect the student learning outcomes of HEIs. This is reflected in performance-dependent funding of HE policies in which the institutions compete to attract high-performing high school students. As an input of HE, the college readiness factor of college entering students is highly confounded with HEIs' performances. For this reason, studies considered the contribution of the college readiness level of college entering students in HE quality assessment of the value-added (Coates, 2009; Cunha and Miller, 2014; Jackson and Kurlaender, 2014; Liu, 2011). Also, numerous studies emphasized direct assessment of HE student learning outcomes (Ďurišová, Kucharčíková and Tokarčíková, 2015; Sønderlund, Hughes and Smith, 2019; Martin and Mahat, 2017; Zlatkin-Troitschanskaia, Pant and Coates, 2016; Xu Solanki and Harlow, 2020). Čechová, Neubauer and Sedlačík (2019) used direct student college entrance data and college study results to assess the relationship between college entry scores and college performance. Similar to previous studies, this study dealt with analyzing the relationship between college readiness and college success measures and did not move further to make explanations on the meanings of this relationship in an applied sense. Also, Otavová and Sýkorová (2016) conducted a comparative analysis of college students' performance across different faculties at the University of

Prague. For the reason that the faculties have diversities in terms of the student abilities and the nature of disciplines, the highly matched groups within and between departments should be compared. The pre-college and college covariates are needed to be controlled.

In the European context, the assurance of the linkage between college readiness and HE learning quality of students is maintained through curriculum-based standardization and validation of prior learning (Sava, Borca and Danciu, 2014). Similarly, the curriculum standards-based approach is widely used in the USA to raise the students' college readiness in line with changing college expectations (Bridges, Wyatt-Smith, and Botelho, 2017; Alonzo, Mirriahi and Davison, 2019; Boud, 2017). For the reason that there is still no one-fits-all quality assessment model, the multidimensional standards-based HE quality assessment approaches have been being applied to assess HE quality (Boud, 2017; Tasopoulou and Tsiotras, 2017; Hrnčiar and Madzík, 2015; Noaman et al, 2017).

Generally, the HE quality assessment models vary in assessing different aspects of HE quality: 1) direct assessment and indirect assessment of HE quality; 2) consideration and inconsideration of the college readiness factors of the students; and 3) taking into account the value-added to student learning and income, and country's economy. Although dimensions of indirect HE quality, such as the service quality, resource quality, the management quality, quality in curriculum, and teaching-learning process are the causes for the quality of the HE student learning outcomes, the assessment remains incomplete and vague unless the comprehensive pre-college and college indicators and measures precisely link these dimensions of HE quality to changes in student learning.

For this reason, building a comprehensive model that merges the indirect HE quality assessment indicators with college readiness indicators to assess direct HE learning outcomes is highly important. However, previous studies focused on some aspects of HE quality. This study attempted to link the direct college readiness and success measures of the participants to the diversity of the HE to assess 1) how the college readiness factor affects the college success of the participants, 2) the quality of the institutions in linking the precollege and college aptitudes while raising the probability of college success; and 3) the extent to which universities and departments vary in maintaining the effect of students' abilities while heightening the probability of college success at the a value of college readiness level.

## MATERIALS AND METHODS

### Models of decision-making

This study considered test-based decision-making quality in college readiness and success assessment as a major factor that affects the validity of direct HE quality assessment. For this reason, the researchers attempted to make a review of the major decision-making models in this section. This is to show the role of decision-making science in enhancing efficiency through student learning management and thereby contributing significant indirect contribution to HE quality management.

In the decision-making process, the decision-maker chooses a course of action or inaction in which an outcome can be an expected behavior or not (McFall, 2015). The literature on decision-making discussed three major decision-making models: normative, prescriptive, and descriptive (Elqayam and Evans, 2011; Kowalski, 2008; McFall, 2015).

Normative decision-making depends on logic and reason and emphasizes the rationality of the decision-making process. In order to verify the norm and rationality of the decision-making process, normative decision-making science created a linear mathematical process that empirically relates alternatives and consequences. Therefore, the main objective of normative decision-making is choosing the best alternative or a group of alternatives that end in the highest expected utility. A normative decision-maker deals with or is challenged by 1) his/her background information about the problem, 2) what others do, and 3) by features or states of nature in the decision-making process (McFall, 2015; van der Linden, 1991).

Although the normative decision-making model is the most widely applied one, it faced criticisms because 1) people unpredictably behave and the rationality and the logical formula does not capture the reality of human behavior, 2) normative decision-making theories exclude cognitive characteristics of human beings such as, anxiety, charity, envy, and others, 3) there are so many extraneous variables that highly distort the logical expected relationship between the alternatives and consequences (Elqayam and Evans, 2011; McFall, 2015; Raiffa, 1994). Generally, the normative decision-making model is highly criticized for its low ecological validity.

The weaknesses of classical normative models caused the birth of bounded rationality in the second half of 20$^{th}$ C (McFall, 2015; March, 1978; Wang, 1996). Let's elaborate on the difference between the normative model's expected utility assumption and the bounded rationality theory of the descriptive model. These studies stated that the normative model conducts an endless and exhaustive search for an alternative or a group of alternatives that ends in a maximum expected utility. However, the supporters of bounded rationality stated that this is fruitless and its benefit is low. Also, classical models depend on logic and norm rather than criteria. These proponents of bounded rationality, however, argue that norms and logic do not bring about satisfactory ends, but the criteria do. For this reason, they conduct a sequential search for a satisfactory criterion or standard that brings about satisfaction. In this study's context, we can raise examples. The contemporary college readiness policymakers tend to favor the descriptive approach; they work on selecting and incorporating the best competency-based standards in the curriculum and teaching-learning process before trusting the quantitative college readiness measures through sole predictions of college success.

Baron (2004) stated that, naturally, most of the problems in the world are more descriptive rather than normative; the decisions on them need descriptive procedure than normative procedure. He also stated that descriptive models deal with both actual behavior and reflective judgment. The descriptive decision-making model emphasizes heuristics and ethics in the contexts of the decision-making process rather than the algorism and the norm. Although the bounded rationality surpasses the expected utility model in practicality and importance across

disciplines, the expected utility models are better in precision and parsimony or simplicity (Mcfall, 2015).

On the other hand, Raiffa (1994) and Baron (2004) pointed out that the prescriptive model especially considers the cognitive characteristics of the individuals. Raiffa argued that normative models should modify themselves in a more applicable manner for human behavior. Baron (2004) also asserted that prescriptive models provide the applicable decision-making procedure for individuals integrating the strong sides of normative and descriptive models. These studies describe the prescriptive model as a hybrid of normative and descriptive decision-making models. For instance, the behavioral model highly emphasizes describing behavior as related to consequences and uses mathematical linear procedures. For its descriptive approach towards a behavior (Mcfall, 2015) and, for the fact that it applies the principle of bounded rationality (Kowalski, 2008) in the decision-making process, it resembles the descriptive decision-making model while, on the other hand, for its use of mathematical linear procedure (Kowalski, 2008), it resembles the classical decision-making model.

Concerned with the dispersed roles in the body of decision-making models, McFall (2015) stated that the previous decision-making models produced proliferative rather than ameliorative processes for decision-making science, and he argued for the development of a metatheory that integrates the merits of all decision-making models for practice. Also, recent studies by Arnold (2018) and Turner and Angulo (2018) integrated classical and contemporary decision-making models and offered a heuristic for analyzing both internal and external pressures in HE. Also, the mechanisms by which schools and HEIs store and use data for decision-making research help them to make rational and effective decision-making in the selection, admission, and placement (Al-Twijri and Noamanb, 2015; Martín-García, Martínez-Abad and Reyes-González, 2019). In general, the contemporary decision-making models in selection and placement take a pragmatic approach.

## Theoretical framework

This study considered the role of test-based decision-making as one of the determinants of the quality of the inputs and outcomes of HE. Test-based prescriptive decision-making typology in HE is based on the use of flowcharts to define various types of decision-making in education. In each decision problem, three common elements are identified: (i) the test that provides the information is based on, (ii) the treatment at which the decision is made, and (iii) the criterion by which the success of the treatment is measured (van der Linden, 1991; van der Linden, 1996). Ben-Shakhar, Kiderman and Beller (1996) also used a threshold utility model to assess the utility of using the SAT, in addition to other tests, for selecting applicants for liberal arts programs. Sawyer (1996) studied the utility functions of placement tests for standard and remedial course placement.

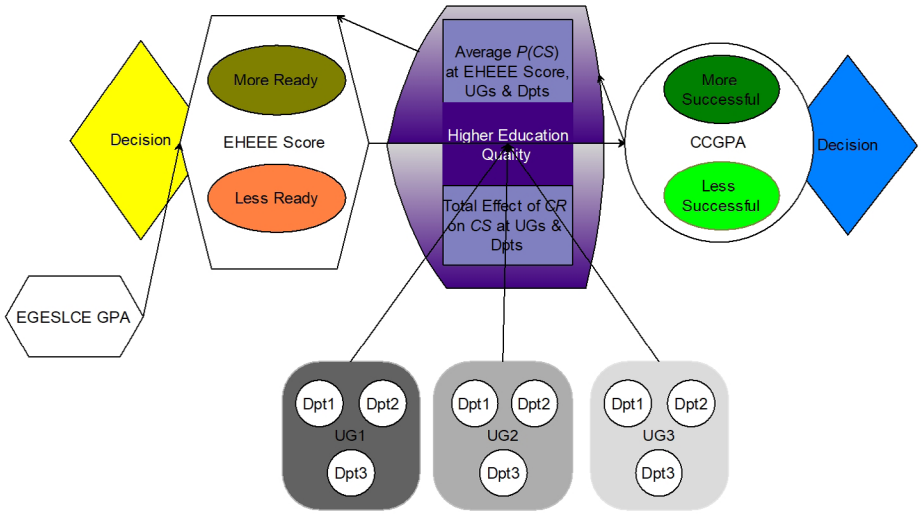
Sawyer elaborated the application of Bayesian theory in test-based decision making as follows: A placement committee determines a particular cutting score (d) from a set $D$ of possible decisions. Then, after the student is admitted to a course, a particular outcome $\theta$ (e.g., grade in a course) occurs, from a set of possible outcomes $\Theta$ (e.g., a set of possible chances of achieving in a course). A Bayesian utility function $u(d, \theta)$ assigns a value to the accuracy and desirability of the decision of the placement committees' cutting score when the outcome is the course grade $\theta$. In the Bayesian decision theory model, this information is described by a subjective probability distribution on $\Theta$; the $\Theta$ quantifies the placement committees' beliefs about the probable values of $\theta$ assuming that both prior beliefs and any relevant data were previously collected. The Bayesian optimal model is to choose the decision d that approximates or maximizes the expected value of $u(d, \theta)$ with respect to the subjective probability distribution on $\Theta$.

In the educational context, these models are used to predict the utility functions of the tests for selection, admission, and placement purposes. What makes these models relevant in this study is that they relate college readiness and success measures. These models emphasized the decisions on tests and their consequences, and they have not been applied for modeling HE quality assessment. However, this study adopted the decision theory's assumption for HE quality assessment taking into account the role of moderators and covariates. The idea is that the validity of the decision on the college readiness measure significantly affects the outcomes of students' college learning. The effect of the college readiness measure on college success is also affected by the moderators. Therefore, this study hypothesizes that, at a valid measure of college readiness, and at a better role of moderators, a higher conditional effect and probability of college success is expected.

## Conceptual framework

In this study, the independent variable, the *Ethiopian Higher Education Entrance Examination (EHEEE)* score, and the covariate, the *Ethiopian General Education School Leaving Certificate Examination (EGESLCE) GPA* were the measures of *college readiness*. The treatment groups, i.e., the *University Generations (UGs)* and *departments*, were used as the moderators between *college readiness* and *college success*. Also, it is assumed that placement of the students to different treatment groups depending on their *EHEEE score* is in the assumption that the *EHEEE score* helped the individuals to be assigned to suitable areas for them; in other words, the treatment groups are assumed to promote the success of the individuals, and the result of success level of the individuals would be revealed through the criterion *College Cumulative Grade Point Average (CCGPA)*.

Although the assumption of the decision theory is used as a cornerstone in this study, the design of this study is built on the quasi-experimental approach. Unlike former decision models, this study gives a stronger emphasis on the role of moderators. Also, it attempted to control for precollege covariates of *college readiness measure*. For this reason, this study took a different statistical design from that is stated by Bayesian statistics although it adopted the assumption of decision theory as a cornerstone.




*Note: P(CS) = Probability of College Success; CR = College Readiness*

*Dpt = department, UG, EHEEE Score, CCGPA, and EGESLCE GPA are previously defined.*

**Figure 1: Conceptual framework**

## Operational Definitions

In this study, the *college readiness* is defined as the academic preparation level of the participants for HE as measured by their *EHEEE scores*. The *College Success* of the participants is also defined as the college academic performance of the participants as measured by their *College Cumulative Grade Point Average (CCGPA)*. The *UG* is the coinage given for a group of Ethiopian universities which have approximately the same time of establishment. The *department* variable in this study refers to a field of study that participants joined after college entry. Also, an aspect of HE *quality* was measured in this study taking into account the extent that UGs maintain the effect of student aptitudes while they enhance the probability of *college success*.

## Objectives

The major objectives of this study were to 1) analyze the total effect and the conditional effect of college readiness on college success at the values of UGs and departments; 2) analyze the differences in the probability of college success across departments and UGs at a value of the college readiness measure, and 3) describe the quality of UGs depending on the sum of the total conditional effects and the probabilities of college success.

## Research methodology

### Hypotheses

The major null and alternative hypotheses of this study were spelled out as follows:

1. H0a: The effect of college readiness on college success is not significant.
2. H1a: There is a significant effect of college readiness on college success.
3. H0b: The conditional effect of college readiness on college success does not significantly differ by UGs and departments.
4. H1b: The conditional effect of college readiness on college success significantly differs by UGs and departments.
5. H0c: The probability of college success at a value of college readiness does not significantly vary by UGs and departments.
6. H1c: The probability of college success at a value of college readiness significantly varies by UGs and departments.
7. H0d: A UG with the highest total conditional effect of college readiness on college success has no highest average probability of college success
8. H1d: A UG with the highest total conditional effect of college readiness on college success has also the highest average probability of college success.

### The research paradigm

The research paradigm is defined as a broad philosophical approach to understanding and researching a phenomenon (Cohen, Manion and Morrison, 2018). The positivist approach makes a quantitative theoretical explanation of a problem depending on what is observed (Hughes and Sharrock, 1997). Post-positivists argue that the positivists' search for the absolute truth of knowledge only through observable data cannot be achieved, particularly, when studying the behavior and actions of humans (Creswell, 2014; Cohen, Manion and Morrison 2018). For this reason, post-positivists updated the assumption of positivists and took a deeper approach to understand a phenomenon; they use additional methods to get adequate information about a phenomenon in addition to observable data.

In the process of understanding the relationship between college readiness, college success, UGs, and departments, this study took a post-positivist stance. After making a quantitative description of the nature of the relationship between these variables, some possible underlying contextual factors that can modify these relationships have been discussed. For this reason, this study moves beyond the deductive test-based

decision theory's assumption in understanding the nature of the relationship between these variables.

### Explanatory correlational research design

Explanatory correlational research design gives explanations on how one variable affects another variable by using more advanced statistical tests, such as regression and Analysis of Variance (Ary et al, 2010; Edmonds and Kennedy, 2017). In this study, how college readiness explained college success through UGs and departments was studied. A type of explanatory correlational research design, i.e., causal-comparative ex post facto design, was a research design of this study. In this design, the groups were those more college-ready and less college-ready participants as they have been grouped depending on the manipulation of the independent variable (i.e., EHEEE). The dependent variable is college success as measured by the CCGPA. The design also included moderating variables (UGs and Departments), and a covariate (i.e., EGESLCE GPA).

### Sampling

It is stated in the theoretical framework of the study that students are placed in various departments (treatments) depending on the college entrance test results. It is assumed that the assignment of the groups to different categories and the manipulation of the variables to observe the effects had already been accomplished by other bodies (MOE and Universities) other than the researcher. For this reason, this study is an ex post facto experimental research in which already matched groups have been selected using a combination of probability and non-probability sampling design. For the reason that universities have significant diversities, the best approach to take a representative group was careful matching, inclusion, and exclusion of the already formed groups.

To this end, the sampling process followed this procedure: 1) the total 33 universities from the three UGs were listed; 2) depending on their similarities in terms of the faculties they consisted of, the total 30 UGs (9 1st generation, 11 2nd generation, and 10 3rd generation) were included in the study. The rest three universities, such as Ethiopian Defense University, Civil Service University, and Adama Science and Technology University were excluded from the study because they show a significant difference from others; 3) The stratified sampling formula[1], $n_k = (n/N)N_k$ was used to calculate the number of universities should be selected from every three groups of universities; 4) After sample size determination and calculation, the total three UGs (i.e., one 1st, one 2nd, and one 3rd generation universities) were randomly selected from each of the three groups; 5) These three universities were compared depending on the faculties they consisted of, and the faculties that were not found in all three universities were excluded from the sample; 6) Three faculties (i.e., Business and Economics, Social Sciences and Humanities, and Natural and Computational Sciences) were randomly selected from the faculties that represent all three universities. In this case, for the reason that the three universities have the same type and number of faculties, the number of faculties that should be selected from each university was not calculated; 7) the departments in all three selected faculties were also matched. Then, departments that were not found in all three faculties were also excluded from the sample; 8) Three departments (i.e., accounting, psychology, and mathematics) were randomly selected from the departments that represent all three faculties; 9) all students in these three departments were included in the study. The 202 (Male = 128, Female = 74) participants from first generation; the 168 (Male = 91, Female = 77) participants from second generation; the 181 (Male = 107, Female = 74) participants from the third-generation university were included in the study. Due to time and financial constraints, only three departments were selected for the study. When all participants are added together, the total sample is 551. Also, two key informants (i.e., one from NEAEA and one from HERQA) were purposively selected for interview using the purposive sampling of non-probability sampling design.

### Interviews

The primary data for this study was the NEAEA and HERQA officers' interview responses. These data were collected through an unstructured interview that was guided by two general interview questionnaire items: 1) How HE quality assessment relates to the college readiness and success measures of students and, 2) What are the procedures of HE entry cutting scores? In this case, the HEQRA officer responded only to the first interview questionnaire item; the second questionnaire item does not refer to him.

### Data collection procedure for the interview data

Before the pilot visit, a formal letter was received from the department of Curriculum and Instruction at Addis Ababa University. During the pilot visit, appointments and schedules were arranged to contact the participants at NEAEA and HERQA. Depending on the appointments, the NEAEA and HERQA participants were interviewed. During the interview, the major responses for the interview were recorded into a notebook.

### Academic achievement data

The academic achievement data for this study were three types: 1) The EGESLCE GPA; 2) the EHEEE score, and 3) the CCGPA. The EGESLCE is a grade 10 nationally prepared certificate examination. This examination recognizes the eligibility for the entry of the Ethiopian Preparatory School for HE. Students who are not eligible for preparatory school enter technical vocational education and training institutions and teachers' college. The EHEEE is a nationally prepared examination for the national assessment of preparation for HE entry. The third document data were the CCGPA of the 2011 Ethiopian Calendar (E.C.)/2018/2019 G.C. graduates.

The EGESLCE tests achievements in 10 subjects, such as Mathematics, English, Geography, History, Biology, Chemistry, Physics, General Academic Aptitude, Civics, and Ethical Education and one subject test that belongs to a local or regional language of the students (NEAEA, 2019; Trines, 2018).

1 $n_k$ = the sample size for $k_{th}$ strata; $N_k$ = the total population of $k_{th}$ strata; *N = the total population size; n = total sample size*

Grading scales of EGESLCE follow A-F norm-referenced scale. A cumulative GPA out of 4.00 is calculated for each of the exam takers. The MOE decides on the minimum cutting score of EGESLCE that makes it eligible for preparatory for HE school.

Grades 11 and 12 are known as the preparatory for HE grades in Ethiopia. Depending on their EGESLCE GPA, students choose either a natural science stream or a social science stream. These streams provide common core courses, such as English, mathematics, physical education, civics, information communications technology, and an elective language (Amharic or local languages). The common core curriculum makes up 60 % of the study load. The courses, such as Biology, Chemistry, Physics, and Technical Drawing are taught in the natural science track whereas geography, history, economics, and business are covered by the social science track (NEAEA, 2019; Education in Ethiopia, 2019).

Students sit for the EHEEE at the end of grade 12. The EHEEE for the social science stream tests achievement in seven subjects, such as mathematics, English, civics, general academic aptitude, history, geography, and economics. Also, the EHEEE for the natural science stream tests the achievement in the seven courses, such as mathematics, English, civics, general academic aptitude, biology, chemistry, and physics.

The EHEEE grading follows a criterion-referenced scoring system; achievements in the subjects are graded on a numerical 0–100 point scale with a total possible score of 700 in the seven test subjects combined. The performance of students in each seven test subjects is converted to 100, and all of them are added and graded out of the total possible score of 700. (NEAEA, 2019; Education in Ethiopia, 2019).

The general grading scales and credit systems that are used in the Ethiopian HEIs share similarities with those that are used in U.S. universities; however, some Ethiopian universities have recently started using the European Credit Transfer and Accumulation System (ECTS). One credit unit is defined as one contact hour per week that is taken over a span of 16 weeks in most of the public Ethiopian universities including the sample universities for this study. The common minimum credit requirement in most of the four-year bachelor's programs is 128 to 136 credits (i.e., 16 or 17 credits or 30 ECTS per semester). Also, a three-year degree can be completed with a minimum of 102 to 108 credits (i.e., 180 ECTS) (NEAEA, 2019; Education in Ethiopia, 2019). All sample departments that were included in this study graduate with three-year degrees. The largest number of Ethiopian universities uses a standard A-F scale. However, some institutions use a simplified version without the "+" and "-" designations. To graduate from bachelor's programs, a minimum cumulative GPA of 2.0 (C) is required (NEAEA 2019; Education in Ethiopia, 2019).

## Data collection procedure for academic achievement data

The document data collection was accomplished in the following procedure: 1) the principal researcher visited the academic vice president offices of the selected universities and received permission to conduct the research; 2) the academic vice presidents sent letters to the registrars of the universities; 3) the heads of registrars formally instructed technical registrar record officers to cooperate on the collection of EGESLCE GPA, EHEEE score, and CCGPA; 4) the researchers made arrangements and appointments with the registrar record officers to collect data. Those data that had not been archived online on the computer were collected from the records. The data collectors who collected the data from the records were funded. Those registrars, whose data were available online, sent the organized data to the researchers via email. Others printed the data and gave it to the researcher.

Also, the documents, such as journal articles, dissertations and theses, books, and conference reports were collected in hardcopy in local libraries and in softcopy from online accredited sources. Especially, those journals subscribed by AAU, such as Science Direct sources, Sage Journals, and Emeralds were the major literature sources for this study.

| UG | Department | EHEEE Score | | | EGESLCE GPA | | | CCGPA | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | M | SD | N | M | SD | N | M | SD | N |
| 1 | Accounting | 443.11 | 58.92 | 138 | 3.10 | .44 | 138 | 2.89 | .47 | 138 |
| | Psychology | 351.58 | 24.58 | 40 | 2.77 | .26 | 40 | 2.75 | .52 | 40 |
| | Maths | 393.83 | 25.66 | 24 | 3.01 | .37 | 24 | 2.99 | .49 | 24 |
| | Total | 419.13 | 62.76 | 202 | 3.03 | .42 | 202 | 2.88 | .49 | 202 |
| 2 | Accounting | 399.80 | 20.72 | 115 | 2.95 | .41 | 115 | 2.84 | .47 | 115 |
| | Psychology | 342.39 | 16.05 | 38 | 2.78 | .43 | 38 | 2.74 | .50 | 38 |
| | Maths | 361.27 | 16.96 | 15 | 2.90 | .23 | 15 | 2.74 | .40 | 15 |
| | Total | 383.38 | 31.40 | 168 | 2.91 | .41 | 168 | 2.81 | .47 | 168 |
| 3 | Accounting | 408.59 | 21.34 | 135 | 3.03 | .31 | 135 | 2.88 | .47 | 135 |
| | Psychology | 352.75 | 9.11 | 24 | 2.72 | .23 | 24 | 2.92 | .64 | 24 |
| | Maths | 363.32 | 15.91 | 22 | 2.81 | .24 | 22 | 2.96 | .57 | 22 |
| | Total | 395.69 | 29.63 | 181 | 2.96 | .32 | 181 | 2.90 | .50 | 181 |
| Total | Accounting | 418.26 | 43.21 | 388 | 3.03 | .39 | 388 | 2.87 | .47 | 388 |
| | Psychology | 348.43 | 19.20 | 102 | 2.76 | .33 | 102 | 2.79 | .55 | 102 |
| | Maths | 374.82 | 25.44 | 61 | 2.93 | .31 | 61 | 2.92 | .50 | 61 |
| | Total | 400.53 | 47.44 | 551 | 2.98 | .39 | 551 | 2.86 | .49 | 551 |

*Note: M = Mean; SD = Standard Deviation; UG = University Generation; EHEEE = Ethiopian Higher Education Entrance Examination; EGESLCE = Ethiopian General Education School Leaving Certificate Examination; CCGPA = College Cumulative Grade Point Average*

**Table 1: Descriptive statistics for document score data**

### Data analysis method

The Process Procedure for SPSS was installed on the SPSS software version 24 and used for the analysis. In this analysis, the effect of college readiness on college success; the conditional effects of college readiness on college success at the values of the UGs and departments; and the probabilities of college success at the values of college readiness level, UGs, and departments were analyzed. Using the binomial logistic regression analysis as the statistical method, the EHEEE score was used as a continuous predictor variable while the UG (i.e., coded as UG1, UG2, and UG3) and department (i.e., coded as Dpt1, Dpt2, and Dpt3) were used as categorical moderators. Also, the EGESLCE GPA was used as a continuous covariate; the CCGPA less than 2.75 was coded as 'less successful', and the CCGPA greater than or equal to 2.75 was coded as 'more successful' was used as a binary dependent variable.

The assumption of linearity in logistic regression assumes that there should be a linear relationship between quantitative predictors and the logit of the outcome variable. This assumption was tested by analyzing the interaction term between the predictor (EHEEE score) and its log transformation, and found that the interaction was not statistically significant ([1]$B$ = .03, [2]$se$ = .03, $p$ > .05). The interaction term between EGESLCE and its log transformation was also not significant ($B$ = -6.04. $se$ = 3.88, $p$ > .05) (See Appendix 2). For this reason, the assumption of linearity was met in this study.

According to Menard (1995), tolerance values less than 0.1 show multicollinearity in the data for the regression analysis. For the reason that the logistic regression does not have the multicollinearity analysis option, testing multicollinearity through linear regression for the logistic regression data is recommended (Field, 2018). In this study, the multicollinearity assumption was checked by running the multicollinearity test using linear regression analysis in SPSS. All tolerance values for the independent variables were greater than 0.1 and all the VIF values were less than 10 (see Appendix 3), and this shows that there were no high correlations between independent variables.

### Sample size determination

To check the adequacy of the sample for binomial logistic regression test, a priori type of power analysis was used in G-power software version 3.1.9.6 (2020). Using effect size input mode of probabilities and the Hsieh, Bloch and Larsen (1998) procedure in G-power, and when the following input parameters were used: Tails = 2; pr($y$ = 1)($x$ = 1)H1 = .6; pr($y$ = 1)($x$ = 1)Ho = .05; alpha error probability = .05; power(1-beta error probability) = .95; $R^2$ other than $x$ = 0; $x$ distribution = normal; $X$ population mean = 0; $X$ standard population deviation = 1, the appropriate sample size was 317. Also, the critical $z$ = 1.96 and the *actual power* was also.95. Therefore, the total sample size ($n$ = 551) of this study is more than adequate for binomial logistic regression.

### Ethical considerations of the study

Before the data collection, the universities' Academic Vice Presidents were contacted; and presidents sent the formal letters to the registrar officers. Then, assurance of the confidentiality for data was clearly described to all concerned groups, and the data were collected after the researchers have received the consent from the participants. In the research report, the names of the universities were left anonymous for purpose of ethical considerations.

## RESULTS

The study was aimed at testing these hypotheses: 1) H1a: There is a significant effect of college readiness on college success; 2) H1b: The conditional effect of college readiness on college success significantly differs by UGs and departments; 3) H1c: The probability of college success at a value of college readiness significantly varies by UGs and departments; 4) H1d: A UG with the highest total conditional effect of college readiness on college success has also the highest average probability of college success.

### The effect of college readiness on college success

It is a generally accepted meritocratic assumption in any education system that college readiness significantly affects college success. In other words, well-ready students will successfully complete their college studies than less college-ready students. However, the degree of preserving this meritocratic principle in education for quality is highly affected by so many institutional and non-institutional moderating and confounding factors. Controlling for some covariates and moderating factors, this study tested the first hypothesis that 'H1a: There is a significant effect of college readiness on college success.' Using the EHEEE score as a continuous predictor variable; the EGESLCE GPA as a continuous covariate, UG and department as moderators, and the CCGPA as a binary criterion variable, the process procedure for SPSS was used to analyze the effect of college readiness on college success at the values of UGs and departments.

As can be seen from Table 2, when the college readiness measure (EHEEE score) is used as a predictor, and the EGESLCE GPA used as a covariate, the model significantly predicted college success (i.e. as measured by CCGPA), Nagelkerke $R^2$ = .26, $p$ < .001. Also, the EHEEE score significantly predicted college success, $B$ = .02, $Se$ = .00, $CI$ = .01 – .03. Therefore, this study fails to reject the hypothesis, 'H1a: There is a significant effect of college readiness on college success.'

1 Unstandardized Beta;
2 Error for Beta

| Coefficients | *B(se)* | LLCI | ULCI |
|---|---|---|---|
| Constant | -10.79***(1.65) | -14.01 | -7.56 |
| EHEEE Score | .02***(.00) | .01 | .03 |
| W1 | -.04(3.10) | -6.03 | 6.12 |
| W2 | 2.40(2.92) | -3.32 | 8.12 |
| EHEEE Score x W1 | .00(.01) | -.01 | .02 |
| EHEEE Score x W2 | .00(.01) | -.02 | .01 |
| Z1 | -18.21* (6.64) | -31.23 | -5.20 |
| Z2 | -5.78(6.60) | -18.72 | 7.17 |
| EHEEE Score x Z1 | .06***(.02) | .02 | .09 |
| EHEEE Score x Z2 | .02(.02) | -.02 | .05 |
| EGESLCE GPA | .94*(.35) | .26 | 1.61 |

*Note: *p < .05; **p < .01; ***p < .001; ModelLL = 116.95; df = 10; p <. 001; Nagelkerke $R^2$ = .26; W1 = UG2; W2 = UG3; Z1 = Department 2; Z2 = Department 3*

**Table 2: The effect of college readiness on college success (N = 551)**

## The conditional effect of college readiness on college success

The extent to which the effect of college readiness on college success is promoted may not be similar across UGs and departments. This study defined this quality of UGs as quality in linking student aptitudes. The conditional effect of college readiness on college success at the values of UGs and departments (see table 3) was used to test the second hypothesis, 'H1b: The conditional effect of college readiness on college success significantly differs by UGs and departments.'

| UG | Dpt | Effect(se) | *Z* | LLCI | ULCI | Effect scores | Total effects |
|---|---|---|---|---|---|---|---|
| 1 | 1 | .02***(.00) | 4.32 | .01 | .03 | 3 | |
| 1 | 2 | .07***(.02) | 3.92 | .04 | .11 | 3 | 6 |
| 1 | 3 | .04(.02) | 2.10 | .00 | .07 | 0 | |
| 2 | 1 | .02*(.01) | 2.55 | .00 | .04 | 1 | |
| 2 | 2 | .08***(.02) | 4.22 | .04 | .11 | 3 | 5 |
| 2 | 3 | .04*(.02) | 2.26 | .01 | .07 | 1 | |
| 3 | 1 | .01 (.01) | 1.87 | .03 | .11 | 0 | |
| 3 | 2 | .07***(.02) | 3.51 | .00 | .03 | 3 | 3 |
| 3 | 3 | .03(.02) | 1.91 | -.002 | .07 | 0 | |

*Note: *p < .05; **p < .01; ***p < .001; *** = 3; ** = 2; * = 1*

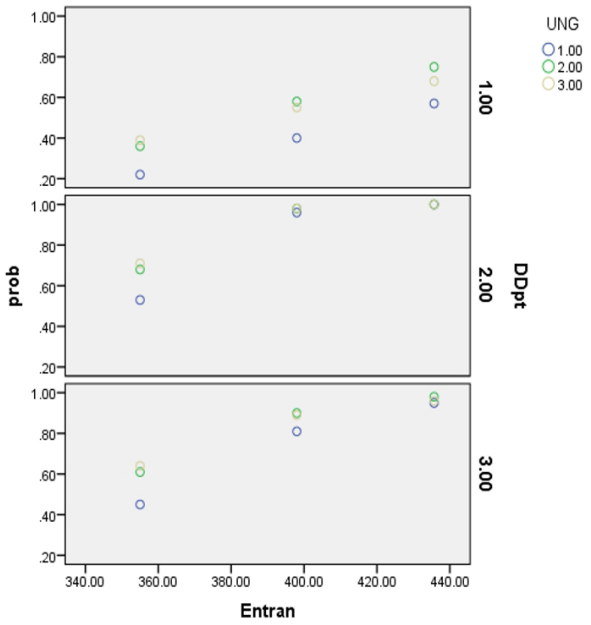
*The effect scores (*** = 3; ** = 2; * = 1) are the measurements given to the significance level of conditional effects to produce simple method to compare the differences across institutions. For example, the effect score for p <.05 is less than the effect score for the p <.01.*

**Table 3: The conditional effect of college readiness on college success at the values of the moderators**

The conditional effect of college readiness on college success at the values of the first two departments in the UG1 is statistically significant, $p < .001$ in both cases (see Table 3). However, the conditional effect is not statistically significant for department three, $p > .05$. The total conditional effect at UG1 is the highest compared to others, total effect = 6 (Table 3); Mean EHEEE score = 419.13 (Table 1).

The conditional effect of college readiness on college success is also found to be statistically significant at the values of three departments in UG2, $p < .05$, $p < .001$, and $p < .05$ respectively. However, the total conditional effect is equal to 5 (table 3); Mean EHEEE score = 383.38 (Table 1).

In UG3, the conditional effect is statistically significant only at the value of department two, $p < .001$. The conditional effect is not significant at the values of the rest two departments, $p > .05$. The total conditional effect is the lowest in the UG3, total conditional effect = 3; Mean EHEEE score = 395.69. The total conditional effects for UG1 and UG2 show similarity (i.e. 6 and 5). Both of the UGs moderated the effect of college readiness on college success in a similar manner. Generally, this study failed to reject the hypothesis, 'H1b: The conditional effect of college readiness on college success significantly differs by UGs and departments.'




*Note: UNG = University Generation; DDpt = Department; Entran = EHEEE score; prob = Probability of college success*

**Figure 2: The probability of college success at the values of college readiness, UG, and department**

## The probability of college success at a value of college readiness, UGs, and departments

When the measurement of college success is seen in a comparative view, many factors can be considered. The two factors that can be considered are the students' college readiness level and the institutional diversities. The probability that the UGs heighten college success is gauged at the values of college readiness. If the probability of college success for a group of students with a higher college readiness level is found to be lower compared to a group of students with lower college readiness, the measurement of college success for employment may go wrong. To analyze this issue, this study tested the hypothesis, 'H1c: The probability of college success at a value of college readiness significantly varies by UGs and departments.'

In this section, the probability of achieving more than or equal to 2.75 in CCGPA at a value of EHEEE score was studied. Appendix 1 and figure 2 displayed the probability of college success (i.e., achieving greater than or equal to CCGPA of 2.75) at a value of an EHEEE score across UGs and departments when the contribution of EGESLCE GPA is taken into account. In other words, it answers the question, 'when the contribution of EGESLCE GPA is taken into account, what is the probability of achieving more than or equal to CCGPA = 2.75 at a value of EHEEE score for somebody who joins one of these three UGs and departments?'

The probability of college success is lowest for UG1, total sum *p levels*[3] = 14; whereas it is 20 and 19 for UG2 and UG3 respectively (see Appendix 1 and figure 2). This finding indicates that those students who join UG2 and UG3 with a value of EHEEE score tend to graduate with high CCGPAs compared to those students who join UG1. It is clearly shown in figure 2 that students who joined UG1, especially those students with lower EHEEE score, achieved lower CCGPA than their peers in other UGs with the same EHEEE score. Therefore, this study failed to reject the hypothesis, 'H1c: The probability of college success at a value of college readiness significantly varies by UGs and departments.'

## College readiness, college success, and HE quality

Linking students' aptitudes through promoting the effect of college readiness on college success is not sufficient if the students cannot be competent in the job market according to their abilities. In other words, the higher linkage of abilities needs to imply higher college success. To deal with this issue, this study tested the hypothesis, 'H1d: A UG with the highest total conditional effect of college readiness on college success has also the highest average probability of college success.'

Depending on the analysis results, the quality of UGs was interpreted from three perspectives: 1) Those UGs that promote the effect of college readiness on college success are more successful in linking the aptitudes of students in education; 2) Naturally, heightening the probability of college success at a value of college readiness is what is expected from any HEI; and 3) Maintaining the highest conditional effect of college readiness on college success while heightening the probability of college success at values of college readiness is a trait of high performing UGs. Therefore, these perspectives have to be promoted simultaneously in order to enhance the performance. Table 4 shows that UG1 is the best in linking student abilities compared with others as it registered the highest total conditional effect (Total effect for UG1 = 6). However, its power in enhancing the probability of college success at a value of college readiness is lower than UG2 (Average probability of college success for UG1 = 4.67; for UG2 = 6.67). On the other hand, UG1 and UG2 have similar performance (e.g., performance = 10.67 for UG1, and 11.67 for

3 *p level* refers to the probability level of college success

UG2) in promoting the effect of college readiness on college success while increasing the probability of achieving high in CCGPA at a value of college readiness. Relatively, UG2 has the highest performance compared to the others. Therefore, the alternative hypothesis, 'H1d: A UG with the highest total conditional effect of college readiness on college success has also the highest average probability of college success,' is rejected in this study. Universities can link the student aptitudes by maintaining the effect of college readiness on college success but they may still fail to heighten the probability of college success at a value of college readiness if their students show low average performance in their cumulative graduation GPAs compared to the graduates from peer UGs.

| UG | Department | Total conditional Effect | Average Probability of college success | Performance |
|---|---|---|---|---|
| 1 | 1<br>2<br>3 | 6 | 4.67 | 10.67 |
| 2 | 1<br>2<br>3 | 5 | 6.67 | 11.67 |
| 3 | 1<br>2<br>3 | 3 | 6.33 | 9.33 |

*Note: Average Prob. of College success = Sum p level Total for a UG / 3; Performance = Total Conditional Effect + Average Probability of College success*

**Table 4: Performance: Total effects and average probability of college success**

According to the current practice in Ethiopia, the CCGPA equals to or greater than 2.75 is the most acceptable in the job market. For this reason, the probability of being recruited (i.e. 4.67 for UG1) in the job market is lower than those who graduated from UG2 and UG3 even though UG1 graduates were well-prepared for college and their ability significantly affected their CCGPA. Most probably, this happens when the UGs focus on a conservative approach in guiding student learning and assessment regardless of utilizing supportive approaches to different groups of students to raise their CCGPA.

## DISCUSSION

Even though academic measures of college readiness, such as SAT scores, High School CPAs, class ranks, and others have faced criticisms in terms of their depth in assessing student readiness, their fairness and freedom from bias, and the low variance they share in explaining college readiness (Niu and Tienda, 2010; Atkinson and Geiser, 2009; Kim and Sunderman, 2005; Lehman, 1999; Rattani, 2016), they are still highly utilized and leading measures of college success. On the other hand, college outcomes are also measured through the number of credits earned in college, CCGPAs, alumni income levels, retention, assignment to remediation, and degree completion. Similar to academic college readiness measures, academic college success measures, e.g., CCGPAs, dominate other college success measures in selection for employment. Especially, the academic college readiness measure (e.g. EHEEE) plays a dominant role in HE entry decisions while the college CCGPA also shares the largest percentage in the decision process of screening the graduates for employment in Ethiopia.

Consistent with the result of this study, previous studies by Allensworth and Clark (2020), Galla et.al (2019), and Shewach et.al (2017) revealed that academic college readiness measures significantly predict college success. Beyond predicting college success from college readiness using these measures, the recent applied studies used the academic college readiness measures as covariates while they used college cumulative GPAs as measures of college outcomes in HE quality assessment studies (Coates, 2009; Liu, 2011; Jackson and Kurlaender, 2014). Also, the value-added HE quality assessment models emphasize direct measurement of student learning outcomes (Shavelson et al, 2016; Brown, McNamara and O'Hara, 2016; Sønderlund et al, 2019).

Although the previous studies used the college readiness and success measures for modeling and estimating the HE quality of the value-added, they did not compare conditional effects of college readiness on college success and probabilities of college success for comparative analysis of university performance.

In theory, there is an established assumption that college readiness affects college readiness. This is because students' college aptitudes significantly correlate with their college readiness. Positive university factors strengthen this relationship. However, the distortion of this relationship can represent the errors and mistakes in the education system.

For this reason, the ability to link the precollege preparedness level of students with their abilities to prepare and be ready for employment is the quality of HE. However, this is not adequate to make a UG a high performer. In addition to linking student abilities precisely, UGs should be able to enhance the probabilities of college success. This means that they should make their alumni competitive in the job market. The standardization of the effects of college readiness on college success and the probability of college success across institutions can be highly assured through standardization of the curriculum, teaching-learning, and degrees like that attempted in Europe. If the curriculum, the teaching-learning, the management, and other services show significant differences across institutions, the achievement of standardized measurement for comparative purposes may not be realized. Also, standardization is not

adequate, and modeling a measurement for applied comparative purposes is highly warranted.

However, some factors may distort this relationship. These factors spread their roots in the education system in general and some of them can be institutional. The lower curriculum and teaching-learning standards that tolerate shallowness in learning; shortage of early warning assessment, and monitoring of student preparedness that simply passes students to higher learning may cause a voluntary and inevitable admission of unprepared students to HE. Especially, the problems in the assessment system contribute to the imbalances between students' CCGPAs and their abilities. The shortage of resources and trained teachers, and the students' motivation towards learning are some causes for unpreparedness.

## CONCLUSION

Generally, there is an established assumption by decision-makers in the selection, admission, and placement system around the world that those students who are screened for college learning through appropriate processes and placed in fields of study that match their interest and ability will also successfully complete their college learning and training. The contemporary decision theory in education, however, tends to take a pragmatic approach and mixes the assumption of all decision theories in practice.

In order to test this assumption in the Ethiopian context, this study tested the assumption that 'college readiness affects college success.' Although this study failed to reject this assumption, the model accounted for only 26 percent of the variance in college success. This means that 74 percent of the variance in college success is explained by other factors. The objective of this study was not only to study how college readiness affects college success; rather, the study was aimed at the meanings of these effects in the applied comparative sense. Firstly, when the conditional effect of college readiness on college success was compared across UGs and departments, a significant difference was observed. Secondly, the study found that the probability of college success at a value of college readiness significantly varied across UGs and departments. Thirdly, in a UG with the highest conditional effect of college readiness on college success, the lowest probability of college success at a value of college readiness is observed. This shows that maintaining a higher effect of college readiness on college success alone may not guarantee the effectiveness of a UG unless the UG simultaneously heightens the probability of college success.

The study also analyzed how this can be related to the quality of HE. Firstly, the study revealed that a UG which significantly promoted the effect of college readiness on college success is relatively more conservative and accurate in managing student learning. Secondly, awarding the highest CCGPA at the lowest conditional effect may show the poor quality of a UG. Also, maintaining a higher conditional effect of college readiness on college success without simultaneously promoting the probability of college success at a value of college readiness ends in poor performance of a UG. Therefore, maintaining a higher conditional effect of college readiness on college success while simultaneously heightening the probability of college success at a value of college readiness is a characteristic of high-performing UG.

The study recommends redesigning of college readiness depending on a rigorous curriculum and teaching-learning standards. To this end, the development of college readiness should be ensured through multidimensional early interventions, monitoring, and partnerships to develop student college readiness. The education system should redesign the college readiness models in line with the feasible and relevant expected outcomes and should monitor the assurance of the college readiness step by step from the early education years.

For the reason that the college readiness level of college entering students is an input for HE quality, HE quality assessment should consider the college readiness variable as a covariate in HE quality assessment. In addition to the current multidimensional models of HE quality assessment, it is believed that the model used in this study can be a new additional input for the HE quality assessment system. This model also can be one of the models that use student university inputs, processes, and students' HE learning outcomes in HE quality assessment.

## ACKNOWLEDGEMENT

We thank Addis Ababa University and Wachemo University for funding this research. Our gratitude also goes to the sample universities' presidents, registrar officers, lecturers, and students for active cooperation with the authors during the data collection. This funding was used for transportation, purchasing research equipment, paying for data collectors, printing and copying research materials.

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## APPENDIX

| EHEEE Score | UG | Department | *Z* | Prob. | *p* Level | Sum *p* level | Sum *p* Level Total |
|---|---|---|---|---|---|---|---|
| 355.00 | 1 | 1 | -1.24 | .22 | 0 | | |
| 398.00 | 1 | 1 | -.42 | .40 | 0 | 1 | |
| 435.68 | 1 | 1 | .29 | .57 | 1 | | |
| 355.00 | 1 | 2 | .11 | .53 | 1 | | |
| 398.00 | 1 | 2 | 3.30 | .96 | 3 | 7 | 14 |
| 435.68 | 1 | 2 | 6.10 | 1.00 | 3 | | |
| 355.00 | 1 | 3 | -.21 | .45 | 0 | | |
| 398.00 | 1 | 3 | 1.43 | .81 | 3 | 6 | |
| 435.68 | 1 | 3 | 2.87 | .95 | 3 | | |
| 355.00 | 2 | 1 | -.58 | .36 | 0 | | |
| 398.00 | 2 | 1 | .32 | .58 | 1 | 4 | |
| 435.68 | 2 | 1 | 1.10 | .75 | 3 | | |
| 355.00 | 2 | 2 | .78 | .68 | 2 | | |
| 398.00 | 2 | 2 | 4.04 | .98 | 3 | 8 | 20 |
| 435.68 | 2 | 2 | 6.90 | 1.00 | 3 | | |
| 355.00 | 2 | 3 | .45 | .61 | 2 | | |
| 398.00 | 2 | 3 | 2.17 | .90 | 3 | 8 | |
| 435.68 | 2 | 3 | 3.68 | .98 | 3 | | |
| 355.00 | 3 | 1 | -.44 | .39 | 0 | | |
| 398.00 | 3 | 1 | .19 | .55 | 1 | 3 | |
| 435.68 | 3 | 1 | .74 | .68 | 2 | | |
| 355.00 | 3 | 2 | .91 | .71 | 2 | | |
| 398.00 | 3 | 2 | 3.91 | .98 | 3 | 8 | 19 |
| 435.68 | 3 | 2 | 6.54 | 1.00 | 3 | | |
| 355.00 | 3 | 3 | .59 | .64 | 2 | | |
| 398.00 | 3 | 3 | 2.04 | .89 | 3 | 8 | |
| 435.68 | 3 | 3 | 3.31 | .96 | 3 | | |

*Note: If prob < .50, p level = 0; If .50 < = prob. < .61, p level = 1; If .61 <= prob > .75, p level = 2; If prob >= .75, p level = 3 prob. = p – value, N = 551*

**Appendix 1: The probability of college success at values of Moderators**

| | | *B* | *Se.* | *df* | *p* | *Exp*(*B*) | 95% C.I.for *EXP*(*B*) | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Lower | Upper |
| Step 1[a] | EHEEE Score | -.23 | .23 | 1 | .31 | .79 | .51 | 1.24 |
| | EGESLCE GPA | 13.98 | 8.15 | 1 | .09 | 1173837.56 | .14 | 1.02 |
| | EHEEE Score by Log Transformation for EHEEE Score | .03 | .03 | 1 | .29 | 1.04 | .97 | 1.10 |
| | EGESLCE GPA by Log Transformation for EGESLCE GPA | -6.02 | 3.88 | 1 | .12 | .00 | .00 | 4.79 |
| | Constant | -11.28 | 13.95 | 1 | .42 | .00 | | |

*p < .05; N = 551*

**Appendix 2: Linearity assumption checking for the binomial logistic regression**

| Coefficients[a] | | | |
|---|---|---|---|
| Model | | Collinearity Statistics | |
| | | Tolerance | VIF |
| 1 | UG | .917 | 1.091 |
| | Dpt | .722 | 1.386 |
| | EHEEE | .413 | 2.420 |
| | EGESLE | .551 | 1.816 |

*a. Dependent Variable: CCGPA; N = 551*

**Appendix 3: Multicollinearity assumption check**

# COMPUTATIONAL SELF-EFFICACY AND INFORMATION SKILLS IN POSTGRADUATE STUDENTS IN ADMINISTRATION AT THE TIMES OF COVID-19

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## ABSTRACT

The objective of the research was to analyze the levels of computational self-efficacy and information skills in postgraduate students in administration at the time of COVID-19 with the aim of determining their relationship in academic performance. The type of study was a quantitative investigation with a correlational scope. The students were the graduate students in administration. The instruments used were two specific questionnaires with a Likert scale of five points each. The main results indicate that, during confinement, students had a frequency of using the laptop for three or more hours with a fixed connection. The level of their computational self-efficacy had an average of 4.55, which is interpreted as a high level where women were valued to a greater extent; while the level of information skills was 4.00 on average, which implies that, almost always, the participants carry out actions aimed at fulfilling the need for information they need to continue their distance educational process during the confinement, regularly using search, use and organization strategies, as well as the evaluation of information sources.

## KEYWORDS

**Computational self-efficacy, information skills, students, postgraduate courses in administration, confinement**

## HOW TO CITE

Cardoso Espinosa E. O., Cortés Ruiz J. A., Cerecedo Mercado M. T. (2021) 'Computational Self-Efficacy and Information Skills in Postgraduate Students in Administration at the Times of Covid-19', *Journal on Efficiency and Responsibility in Education and Science*, vol. 14, no. 2, pp. 118-129. http://dx.doi.org/10.7160/eriesj.2021.140205

**Article history**
**Received**
October 22, 2020
**Received in revised form**
February 7, 2021
**Accepted**
June 7, 2021
**Available on-line**
June 30, 2021

***Highlights***

- *The postgraduate students in administration are familiar with the strategies for searching, using, organizing and evaluating computer resources which allow the generation of useful knowledge.*
- *The postgraduate students in administration have a high computational self-efficacy that has allowed them to continue with their academic training during confinement.*
- *The academic training of postgraduate degrees in administration in the future will be taught through the hybrid model that will allow students an organization and logistics on their time, rhythm and learning itinerary.*

## INTRODUCTION

The World Health Organization established in March 2020 the health emergency situation generated by the COVID-19 international pandemic, which directly impacted the educational systems of all countries, affecting the student body, homes, secretariats, educational centers, teachers and managers. Based on the above, the closure of educational centers was implemented as an extraordinary measure to contain the progression of the pandemic, so that 87% of students worldwide were no longer receiving their face-to-face classes (UNESCO, 2020). The distance education strategy was implemented, characterized by the use of digital content, platforms, and learning management systems. The purpose was to maintain the interaction between schools and students, so in the short term it is relevant to investigate the effect that it will have on the academic training of students by replacing face-to-face with virtual education (OECD, 2020; OEI, 2020). The confinement generated a rapid transition of the students

to adapt and continue with their academic training, which has modified their personal and work activities to be carried out, where the factor of connectivity in the homes has been included, which affects the availability and time of use in front of a computer (Wang et al., 2020). Similarly, UNESCO (2020) establishes that the behavior of graduate level students in times of COVID-19 has had the openness, willingness and availability to integrate into distance education, which demands a greater degree of responsibility and commitment to academic training. However, it is important to note that they have also faced various personal and family situations and that when they found themselves working from home, they had to face and solve these challenges caused by the pandemic.

In this sense, the school as a physical place for students to acquire the skills to develop, changed drastically as it became a virtual environment where it no longer only focuses on promoting the expected learning, but also involves the emotional component that generates a motivation to continue with the academic training by the student body. Thus, the reorientation of the objectives and goals is essential for successful achievement during confinement to continue the educational service by the teaching staff (Yıldızlı, 2019). To achieve this, in the situation caused by the presence of COVID-19, schools and teachers have incorporated technological resources, access and use of databases, and the adjustment of calendars to the postgraduate level to give continuity to the academic process (Martin and Furiv, 2020).

Similarly, the Banco Interamericano de Desarrollo (BID, 2020) considers that a relevant factor during confinement is the intrinsic characteristics that make students successful in distance education because their learning level is associated with their psychological traits and socio-emotional abilities. Thus, self-efficacy, motivation and skills in the management of technologies are the main elements associated with better results in educational performance (Wang et al., 2008). According to Safari, Davaribina and Khoshnevis (2020), self-efficacy is related to the belief of being successful in solving situations. In addition, it implies a positive state of mind to face the challenges generated. It also provides the security of being in control of emergencies, thereby reducing the degree of stress and depression.

Particularly in Mexico during March 2020, urgent measures were implemented for higher education institutions (HEIs) in order to give continuity to the delivery of programs through non-school options to successfully conclude the school period (ANUIES, 2020). Based on the above, the Instituto Politécnico Nacional (IPN, 2020) implemented the Virtual Plan for Academic Continuity organized by a set of technologies, resources, and tutorials. Its purpose was to pursue academic training in a collaborative online learning environment. Academic activities for the graduate level were carried out through virtual classrooms (Google Classroom); workspaces and collaboration (Microsoft Teams) and classes by videoconference (Zoom). The implementation of the Virtual Plan generated various ways of academic work and changes in the functions of its main educational actors: students and teachers, so it is relevant to carry out research on the abilities, skills and attitudes that have been evidenced during the emergency generated by COVID-19 and its impact on the culmination of the academic training of students.

Consequently, the main objective of the study is to analyze the levels of computational self-efficacy and information skills in postgraduate students in administration in times of COVID-19 in order to determine their relationship with academic performance.

## Previous literature

The current socioeconomic approach considers knowledge and information and communication technologies (ICT) as structuring principles of changes in the different sectors and productive processes of a country. In the same way, the 21st century society is characterized by a growing use of technological means, by the digitization of data and by the handling of a large amount of information, which has generated the emergence of new demands in the training of individuals who need to develop skills that allow them to access information, select it and disseminate it from any means both nationally and internationally. On the other hand, the success of organizations is measured by the development of capacities in productivity, innovation and creation of strategic value, which are achieved to the extent that human capital has the training to create, organize, share, apply and communicate knowledge (Jerónimo and Juárez, 2018; Bailey et al., 2017). Therefore, information and knowledge are the key elements for the operation and improvement of the quality of higher education because they enable the management of content, quantity, timeliness, relevance, acquisition and communication among its members (Lai and Wei, 2013).

Hence, higher education, where the postgraduate program is located, requires to consolidate its important role in the generation of human talent with fundamental capacities for the creation, storage and dissemination of knowledge, as well as the management of information, technology and digitization of the processes carried out in organizations (Begoña, 2015). In addition, in the context originated by COVID-19 which has forced the educational systems of the countries to establish distance education, it is relevant to investigate the knowledge, skills and attitudes of students both for the use of technological tools and for the management, analysis and uses of the information to determine if they are able to continue with their academic training. Therefore, computational self-efficacy and information skills are oriented towards literacy in technological tools (knowledge and use of hardware, software and multimedia programs); resource literacy (methods of access to informational resources); a research literacy (tools for academic work) and a literacy for publication (ability to disseminate and publish), which are used during academic training at the postgraduate level (López-Yepes, 2019).

From the contribution of the social cognitive theory of Bandura (2006), self-efficacy is defined as the assessment of one's own abilities to successfully perform a series of tasks. Therefore, self-efficacy is focused on beliefs about the capabilities of an individual that allow him to successfully achieve a series of activities; in this sense, people with a higher level of self-efficacy have a greater scope in their personal goals, which generates better mental health (Safari, Davaribina and Khoshnevis,

2020). On the other hand, computational self-efficacy according to Compeau and Higgins (1995) and Marakas, Yi and Johnson (1998), is defined as the judgments of a person to use a computer, so it refers to the acquired capacities that are available to face the activities to be carried out in the future. This construct has been considered as a strategic capacity for the management and solution of various situations both at a personal and work level of a person (Kukul and Karatas, 2019). A person with high computational self-efficacy competently employs a variety of computer tools and systems based on the use of hardware and software.

The importance of investigating computational self-efficacy is to identify the strengths and weaknesses perceived in the students because if they consider the activities to be carried out as difficult, it is very likely that they will give up continuing with their academic path (Dumbauld et al., 2014). This term includes two relevant factors: efficiency in the performance as a person and effectiveness in achieving objectives (Safari, Davaribina and Khoshnevis, 2020). On the other hand, in the investigations of Bates and Khasawneh (2007) and Pellas and Kazanidis (2014), they determined a regular level of computational self-efficacy in the student body and concluded that it is a predictor of academic performance. In addition, it promotes commitment, responsibility, collaborative work and student satisfaction when using digital tools. In the studies by both Miura (1987) and Durndell, Haag and Laithwaite (2000), they found that males obtained higher scores in computational self-efficacy and concluded that it is a priority factor for the use or not of the computer. Subsequently, in the investigation of Durndell and Haag (2002) they found as results the existence of a significant correlation between computational self-efficacy, low computational anxiety, high positive attitude towards the Internet, as well as a longer time to use the Internet.

Meanwhile, García, Hernández and Peinado (2009) found that the computational self-efficacy of the student body presents a high average. Peinado de Briceño and Ramírez (2010b) identified a high level associated with a higher score in academic performance. Peinado de Briceño and Olmedo Casas (2013) in their study determined that the place of use, training and frequency of use of the computer have significant effects on computational self-efficacy. Specifically, they found that those students who use the computer on a daily basis perceive themselves with greater computational self-efficacy; those students who use the computer at home, have a higher computational self-efficacy and, the male gender are evaluated with a higher self-efficacy compared to the female. In the study by Krejčová, Chýlová and Michálek (2019), they found statistically significant gender differences in the category of perceived education, where females perceived themselves as having a higher level of self-efficacy and recommend investigating the relationship between computational self-efficacy with the educational trajectory of students. On the other hand, Yıldızlı (2019) establishes the importance of including the management of self-efficacy in the educational environment as study variables, as well as the influence of teachers in the construction of student self-efficacy.

On the other hand, a person is competent in information skills if he/she accesses and searches for information, efficiently uses it, and critically evaluates the diversity of sources and their relevance, which allows an effective organization to achieve the activity (Allison, 2015; Sánchez Díaz, 2012). Solís Valdespino (2013) determines that the information skills are to identify the structure of knowledge and information; recognize the need to use the information; formulate strategies for the search and retrieval of information; analyze and evaluate the information; organize, synthesize and use the information for the presentation of the results based on intellectual property and copyright. Its importance at the postgraduate level is to identify the key information from the research to organize it properly, selecting the correct and reliable sources based on its relevance and quality, which is why information skills are a relevant element in the educational training of students (Bruce, 2003; García and Díaz, 2007). Therefore, information skills are a strategic factor to increase the effectiveness of the teaching-learning process (Marzal Martínez et al., 2011).

The findings of previous research constitute the empirical foundation that corroborates that computational self-efficacy and information skills are relevant topics to be studied at the postgraduate level because students during their academic training use digital tools as the main means for searching, analyzing, organizing and synthesizing the information they consult in various sources. Based on the above, the importance of the study is to analyze the relationship between computational self-efficacy and information skills, which according to the previous literature are strategic factors that influence the academic performance of students. Specifically, the relevance of the research for postgraduate degrees in administration is to provide useful information on these two variables due to the fact that, before the appearance of COVID-19, they were taught in the face-to-face modality which characteristics of both teaching and learning are different from a distance modality. Therefore, the obtained results will be useful for the formulation of academic training strategies for a hybrid model that will be implemented once the confinement for these postgraduate programs is concluded.

During the COVID-19 pandemic, when the confinement was decreed and the remote modality was implemented, the use of technological tools became the priority element to continue with academic training, which implies the use of both computational self-efficacy as well as information skills. Thus, it was formulated: There is a direct and significant association between computational self-efficacy and information skills in the academic performance of postgraduate students in administration in times of COVID-19.

## MATERIALS AND METHODS

### Type of research

Based on Hernández and Mendoza (2018), the type of study was a quantitative research with a correlational scope because it focused on determining the levels of both computational self-efficacy and information skills in the academic performance of postgraduate students in administration during confinement. The three research variables were computational self-efficacy and information skills, the information of which was collected from the application of two instruments; while the third variable was the academic performance obtained from the final average of each participant in the first semester of 2020.

## Participants

The population was made up of students who were studying a graduate degree in administration taught at the Instituto Politécnico Nacional (IPN) during the first semester of 2020, which was when the health emergency due to COVID-19 was announced, giving a total of 130 participants distributed in four programs: Master of Science in Business Administration (P1); Master in Sustainable Business Administration (P2); Master of Administration in Public Policies (P3) and Doctorate in Administrative Sciences (P4). Based on Münch and Ángeles (2007), the sampling was carried out with 95% reliability with a $p = 0.5$ and $q = 0.5$, as well as an error of 5%, for which a sample size of 92 subjects was obtained as shown in Table 1.

| Educational program | Age (years) | Gender | | Semester | | | |
|---|---|---|---|---|---|---|---|
| | Mean | Female | Male | I | II | III | IV |
| P1 | 25.3 | 17 | 14 | 12 | 10 | 8 | 5 |
| P2 | 26.2 | 13 | 12 | 9 | 9 | 7 | 2 |
| P3 | 25.7 | 10 | 9 | 8 | 7 | 5 | 1 |
| P4 | 32.4 | 9 | 8 | 3 | 2 | 3 | 1 |
| Total | 27.4 | 49 | 43 | 32 | 28 | 23 | 9 |

**Table 1: Characteristics of the participants**

From Table 1, the main characteristics of the sample were for age, a mean of 27.4 years was found; the distribution by gender was 53% in women and 47% in men. While for the semester, it was found that 35% study the first, 30% the second, 25% the third and the remaining 10%, the fourth. Regarding the program of study, it was identified that 35% correspond to P1; 32% to P2; 23% to P3 and the remaining 10% to P4.

## Instruments

To carry out the research, two instruments were used to measure computational self-efficacy and information skills. The first was to determine computational self-efficacy, which was designed and validated by Peinado de Briceño and Ramírez (2010a), and has a total explained variance of 80.10%; each of the items that make it up have a load greater than 0.40 and their reliability based on Cronbach's alpha coefficient is 0.895, so their internal consistency is good. This instrument uses a five-point Likert-type scale ranging from totally disagree (1), disagree (2), neither disagree nor agree (3), agree (4) and totally agree (5) where it is composed of three dimensions: basic skills; advanced skills and internet skills.

Meanwhile, the second instrument was a questionnaire to study information skills, which was developed and validated by Girarte Guillén and del Valle López (2020). Its main characteristics are: sampling adequacy and Barlett's sphericity test ($KMO = 0.906$, $p < 0.001$) for which it presents a good adaptation to the factorial model. The total variance explained is 67.601% with the fulfillment of the existence of communality of at least 0.504. The reliability obtained by Cronbach's alpha coefficient is 0.958; therefore, it has a high internal consistency. This instrument also uses a five-point Likert-type scale ranging from never (1), almost never (2), occasionally (3), almost always (4) and always (5) where the dimensions are information needs; search and recovery; use of information; organization of information and evaluation of sources.

The relevance for using the two instruments was due to the fact that it was validated with participants at the postgraduate level both in its exploratory and confirmatory analysis, in addition to meeting the criteria of relevance and timeliness, coupled with the fact that the authors recommended its application to validate its use in other contexts (Peinado de Briceño and Ramírez, 2010a; Girarte Guillén and del Valle López, 2020). For the content validity of the instruments, the expert judgment technique was used; therefore, five researchers with a high degree of knowledge about educational research and distance educational environments with a trajectory of at least 10 years were selected. The experts analyzed them in the aspects of clarity, congruence and bias of the items to later carry out the necessary modifications. For the reliability of the instruments, it was carried out using Cronbach's alpha coefficient.

The internal consistency of the first instrument by means of Cronbach's alpha coefficient was 0.813, which is why it is interpreted as good. The construct validity through the principal component analysis based on the *KMO* test was 0.945 and the Bartlett test of sphericity was statistically significant ($\chi^2 = 953.58$, $p < 0.001$), which indicates the existence of a good adequacy of the information obtained for a factorial model. The exploratory factor analysis was carried out, in which the existence of three factors that explained 79.12% of the total variance was found, which represents a valid multidimensional measure. For the second instrument, Cronbach's alpha coefficient was 0.876; the construct validity through the principal component analysis based on the *KMO* test was 0.953 and the Barlett's test of sphericity was statistically significant ($\chi^2 = 1134.24$, $p < 0.001$) indicating a good fit for a factorial model. The exploratory factor analysis indicated the existence of five factors that explain 83.34% of the total variance (Morales, 2011).

Regarding the application of the two instruments, it was carried out through email, in which the objective of the investigation with the guarantee of confidentiality was indicated to each participant.

## Data Analysis

Once the information was collected, the SPSS version 25 program was used to organize and analyze the data obtained from the participants through the use of descriptive and inferential statistics (Pérez, 2004). Thus, it was necessary to verify the normality or not of the distribution of the study data using the Kolmogorov-Smirnov (*K-S*) statistical test. In

the same way, parametric tests such as Pearson's *r* correlation coefficient, as well as two-way Student's *t* test and the one-way *ANOVA* test were used to determine the existence or not of significant differences and to find the level of association between the study variables with a level of significance of $p < 0.05$.

## RESULTS

With regard to the situations faced by the postgraduate students in administration during the health emergency, they are organized in Table 2. The main situations were of a logistical nature (organization and management of time, class, work and family schedules; physical space for working remotely); of a socio-affective type (circumstances related to affective and health aspects) in which the students acknowledged experiencing feelings of sadness, frustration, anxiety, tiredness and demotivation; educational (remote participation, carrying out activities and sending assignments online) and technological (internet access and availability of computer equipment). In the same way, the findings obtained in Table 2 are relevant because they indicate the diversity of situations that postgraduate students in administration have faced during the COVID-19 pandemic in which, before, the provision of academic training was face-to-face, so they did not face this type of events on a recurring basis. Thus, the issues which stand out are: The management of time to face, organize and comply with the simultaneous attention both for their postgraduate academic training as well as for their work and personal life. The manifestation of the socio-emotional component due to the fact that it is a new experience which the students had not lived and that an abrupt change from the face-to-face modality to a virtual one was not in their training plans. In addition, the technological element in which it was found that some students lack their own computer equipment since they use the equipment from their work center, so they were attended through other devices such as tablets or cell phones.

| Item<br>During the confinement I had to | Mean | Standard deviation |
|---|---|---|
| Organize my time to fulfill my training | 4.89 | 0.21 |
| Establish a physical space to fulfill the academic and work | 4.78 | 0.57 |
| Address family situations | 4.26 | 0.91 |
| Comply with work activities | 4.11 | 0.98 |
| Lose my source of employment | 4.51 | 0.74 |
| Experience frustration | 4.67 | 0.64 |
| Experience sadness | 4.53 | 0.77 |
| Live with anxiety and uncertainty | 4.81 | 0.32 |
| Recognize fatigue for completing academic and work duties | 4.32 | 0.93 |
| Feel disinterested and unmotivated | 4.13 | 0.98 |
| Participate remotely but it has been difficult for me | 3.79 | 1.09 |
| Do the learning activities but it has been difficult for me | 4.08 | 1.02 |
| Submit tasks but it has been difficult for me | 3.68 | 1.15 |
| Solve problems with internet access | 3.12 | 1.42 |
| I don't have a computer equipment | 3.06 | 1.69 |

**Table 2: Situations faced by the participants**

On the other hand, Table 3 shows the findings of the computational self-efficacy of the postgraduate students in administration.

Based on Table 3, a general mean of 4.75 points is found for the basic skills dimension, which is interpreted as a high assessment from the perception of the postgraduate students in administration and refers to the fact that they agree to use these skills when they use a computer. In particular, those related to opening and saving a file (4.91), working on a personal computer (4.87), the correct handling of storage devices (4.85), accessing and exiting a computer program (4.84) are identified with the highest averages, as well as using the computer to write a dossier or report (4.82).

Regarding the dimension of advanced skills, a global average of 4.23 points was determined, which is interpreted as a high assessment in the level of development of the students, which implies that the participants agree to use these skills when they use a computer. In the same order, skills with higher averages stand out, such as using the computer to organize information (4.95), understanding terms related to software (4.83), adding and deleting information from a file (4.78), managing software installed in the computer (4.76) and the use of a program for data analysis (4.57).

For the third dimension called Internet skills, a general average of 4.66 points was obtained, which is interpreted as the participants having a high level of development that means a continuous mastery when they access, visit and consult the Internet to carry out the activities related to their academic training at the postgraduate level. In the same way, of the eight skills that make up this dimension, seven have an average score greater than 4.50. Only the handling and interaction through a forum or chat is valued with a 4.24. Finally, the global mean for the variable of computational self-efficacy is 4.55, which is interpreted as a consolidated level of development in the postgraduate administration students. That is, the participants of the study agree that basic, advanced, and internet skills are important when using a computer.

| Item<br>During confinement | Mean | Standard deviation |
|---|---|---|
| Mastery experiences | | |
| I know how to work on a personal computer | 4.87 | 0.56 |
| I know how to handle the software installed on the computer | 4.76 | 0.69 |
| I know how to access and exit a computer program | 4.84 | 0.18 |
| I handle storage devices correctly | 4.85 | 0.17 |
| I can add and delete information from a file | 4.78 | 0.18 |
| I send an email | 4.93 | 0.04 |
| I use the computer to organize information | 4.95 | 0.03 |
| I know how to attach files to an email | 4.96 | 0.02 |
| I can read and reply to an email | 4.97 | 0.03 |
| Vicarious experience | | |
| I know how to open and save a file to work | 4.91 | 0.06 |
| I understand the terms related to hardware | 3.84 | 1.14 |
| I understand the terms related to the software | 4.83 | 0.21 |
| I can use a specific computer program to analyze numerical data | 4.57 | 0.84 |
| I know how to transfer from one storage device to another | 4.21 | 0.96 |
| I use the computer to write a dossier or report | 4.82 | 0.11 |
| I know how to locate information on the Internet | 4.55 | 0.91 |
| I use digital tools for my academic training | 4.56 | 0.94 |
| Social persuasion | | |
| I can carry out teamwork with support on the Internet | 4.55 | 0.83 |
| I can use a variety of computer programs | 4.14 | 0.94 |
| I know how to store information found on the Internet | 4.52 | 0.86 |
| I know the menu of every computer program | 4.64 | 0.92 |
| I know how to handle and interact through a forum or chat | 4.24 | 0.96 |
| I know the functions of the computer hardware | 4.11 | 0.98 |
| I organize and manage files simultaneously | 4.36 | 0.91 |
| I have skills to learn about a specific program | 4.21 | 0.86 |
| Affective states | | |
| I read user guides when I need help | 3.85 | 1.12 |
| I understand the three phases of information processing: input, process and output | 4.07 | 1.09 |
| I store programs correctly | 4.34 | 0.92 |
| I explain why a program will or will not run on the computer | 3.77 | 1.04 |
| I solve computer technical problems | 3.73 | 1.13 |
| I seek help when I have technical problems | 4.04 | 1.03 |
| I delete files when they are no longer needed or storage runs out | 3.73 | 1.16 |

**Table 3: Descriptive statistics of computational self-efficacy**

In relation to the level of development of information skills in postgraduate students in administration, they are shown in Table 4.

Based on Table 4, for the first dimension of information skills referring to the need for information, a general mean of 4.25 points was found, which means that almost always postgraduate participants recognize the relevance of requiring information for their academic training during confinement. Thus, the skills with the highest average are to summarize and outline the information (4.72), the consultation and use of electronic sources (4.68), differentiate between the types of information (4.43), clarity of the objective when a search is carried out (4.32), identify the main ideas of the documents (4.28), the use of various sources of information in research (4.15), as well as recognize the information required (4.14).

For the second dimension of information skills on search and recovery, a general average of 3.92 points was obtained, which is interpreted as the fact that participants occasionally carry out activities related to the location and recovery of lost files during their remote academic training. Among those that stand out for a greater assessment by the student body is to determine if the information contained in a resource is updated (4.63), as well as to know and use the information banks and digital repositories (4.21).

Regarding the third dimension about the use of information, a global average of 3.80 points was found, the finding of which is interpreted as the fact that occasionally, during confinement, postgraduate students in administration use the information resource for management, analysis and interpretation. So, it is deduced that they are in a process of academic development according to the semester in which they are. In this sense, the competence with the highest value was making academic presentations using computer programs (4.87).

| Item<br>During confinement | Mean | Standard deviation |
|---|---|---|
| I am able to identify the information I need | 4.14 | 0.87 |
| I am clear about the objective when I perform a search | 4.32 | 0.83 |
| I can consult and use electronic sources of information | 4.68 | 0.81 |
| I know how to discriminate between types of information sources | 4.43 | 0.92 |
| I can identify the main ideas of documents | 4.28 | 0.89 |
| I can evaluate the quality of information resources | 3.75 | 1.03 |
| I know how to use various sources of information in the research process | 4.15 | 0.80 |
| I can define the depth level of the content I want to get | 3.79 | 1.27 |
| I can summarize and outline the information | 4.72 | 0.86 |
| I know and apply the legislation on the use of information and intellectual property | 3.47 | 0.94 |
| I know the typology of the sources of scientific information (research articles, discussion articles, thesis and conference proceedings) | 3.92 | 0.99 |
| I know how to access and use information banks and digital repositories | 4.21 | 1.13 |
| I know how to use reference managers (Mendeley, EndNote, RefWorks) | 3.53 | 1.34 |
| I am able to determine if the information contained in a resource is up to date | 4.63 | 1.14 |
| I know the terminology of the knowledge area in which I search for information | 3.88 | 1.29 |
| I know the most relevant authors or institutions in the field of the subject I am researching | 3.78 | 1.42 |
| I know how to properly disseminate information on the Internet (web, blogs, congresses and magazine ads) | 3.21 | 1.48 |
| I can make academic presentations using computer programs such as Power Point | 4.87 | 0.25 |
| I know how to publicly communicate the results and conclusions | 3.39 | 1.45 |
| I can write a document (academic report or research report) | 3.94 | 1.02 |
| I handle the different citation styles | 3.84 | 0.95 |
| I can write a bibliography according to a citation style | 3.54 | 0.93 |
| I handle statistical programs in the research process | 3.75 | 1.15 |
| I can interpret research results (tables and graphs) | 3.24 | 1.53 |
| I can handle different strategies in the use of information | 4.23 | 1.24 |
| I use the information bearing in mind the respect for copyright | 3.64 | 0.95 |
| I am able to recognize the structure of a text | 4.82 | 0.88 |
| I know the ethical code of my academic and professional field | 3.91 | 1.02 |

**Table 4: Descriptive statistics of information skills**

Meanwhile, for the fourth dimension focused on the organization, a general average of 3.74 points was found, which is interpreted in that occasionally the postgraduate participants carry out a planning of the activities to be carried out to obtain and structure the information they locate. Hence, there is only one competence with the highest average, which is the management of different strategies for the use of information (4.23).

While for the fifth dimension on the evaluation of sources, a general average of 4.12 was determined, which means that the postgraduate students in administration almost always carry out their academic training at a distance. There is only one competence which is to recognize the structure of a text (4.82). Finally, the information skills on their global scale obtained 4.00, a fact which is interpreted in that almost always the participants during confinement take actions oriented towards meeting the need for information they require to continue with their distance educational process using strategies of search, use, organization and evaluation of information sources.

Subsequently, to determine if the hypothesis of the study is verified, the *K-S* test was used for the two research variables: For computational self-efficacy, the statistic test was 0.715 with a $p = 0.384$, which is why it is concluded that its distribution is normal. For information skills, the statistic test was 0.856 with a $p = 0.211$, so the fulfillment of normality in its distribution is concluded. Therefore, Pearson's $r$ correlation, two-sided Student's $t$ and one-way *ANOVA* are used as the parametric tests.

| Variable | Computational self-efficacy | Information skills | Academic performance |
|---|---|---|---|
| Computational self-efficacy | 1.000 | 0.548* | 0.836* |
| Information skills | | 1.000 | 0.764* |
| Academic performance | | | 1.000 |

*$p < 0.05$*

**Table 5: Correlation between computational self-efficacy, information skills and performance**

Table 5 shows the correlations between the study variables in which the findings were found as follows: There are direct and significant associations between computational self-efficacy and information skills of 0.548, between computational self-efficacy and academic performance of 0.836, as well as between information skills and academic performance with a 0.764. Based on these results, the research hypothesis regarding the existence of a direct and significant association between computational self-efficacy and information skills with the academic performance of postgraduate students in administration in times of COVID-19 is verified.

| Gender | Computational self-efficacy | *t* | *p* | Information skills | *t* | *p* |
|---|---|---|---|---|---|---|
| | Mean | | | Mean | | |
| Female | 4.86 | 4.214 | <0.001 | 4.47 | 0.500 | 0.214 |
| Male | 4.24 | | | 4.36 | | |

**Table 6: *t* test for gender**

From Table 6, the existence of a significant difference was found for the variable of computational self-efficacy with respect to gender ($t = 4.214$, $p < 0.001$), but the test of homogeneity of variances is not statistically significant ($p = 0.416$). This finding implies that females perceive themselves with a higher level of computational self-efficacy with respect to males. On the contrary, for the information skills variable, there is no significant difference in gender ($t = 0.500$, $p = 0.214$) and the test of homogeneity of variances is also not statistically significant ($p = 0.153$). This result implies that both males and females are valued with the same level of mastery in information skills.

| Semester | Computational self-efficacy | *ANOVA* (*F*) | *p* | Information skills | *ANOVA* (*F*) | *p* |
|---|---|---|---|---|---|---|
| | Mean | | | Mean | | |
| First | 3.97 | 5.624 | <0.001 | 3.37 | 7.638 | <0.001 |
| Second | 4.60 | | | 3.55 | | |
| Third | 4.78 | | | 4.39 | | |
| Fourth | 4.85 | | | 4.69 | | |

**Table 7: *ANOVA* test for the semester**

Table 7 shows the results of the one-way *ANOVA* test for the study semester in which the study participants were enrolled. Significant differences were found for computational self-efficacy ($F = 5.624$, $p < 0.001$) and the test of homogeneity of variances is not statistically significant ($p = 0.345$). For the information skills, significant differences were also found ($F = 7.638$, $p < 0.001$) and the test of homogeneity of variances is not statistically significant ($p = 0.423$). Therefore, the previous results indicate the existence of statistically significant differences in the research participants in the postgraduate degrees in administration for the two variables of the study.

| Program | Computational self-efficacy | *ANOVA* (*F*) | *p* | Information skills | *ANOVA* (*F*) | *p* |
|---|---|---|---|---|---|---|
| | Mean | | | Mean | | |
| P1 | 4.62 | 8.345 | <0.001 | 3.79 | 4.254 | 0.002 |
| P2 | 4.49 | | | 4.03 | | |
| P3 | 4.23 | | | 3.95 | | |
| P4 | 4.86 | | | 4.23 | | |

**Table 8: *ANOVA* test by educational program**

Table 8 shows the results of the one-way *ANOVA* test by the educational program, where statistically significant differences were found for computational self-efficacy ($F = 8.345$, $p < 0.001$) and the test of homogeneity of variances is not statistically significant ($p = 0.526$). Similarly, for the information skills, statistically significant differences were also determined ($F = 4.254$, $p < 0.001$) and the test of homogeneity of variances is not statistically significant ($p = 0.286$). So, previous results indicate that both study variables have a different domain in each graduate degree in administration.

## DISCUSSION

The health emergency due to the coronavirus generated as a fundamental requirement the integration of technological tools to maintain the educational service in order not to affect the academic training of the student body, which is why it coincides with Martin and Furiv (2020) because the student body has a technological device, a type of the Internet connection, as well as allocates a time of at least three hours to carry out academic activities at the graduate level. Thus, the statement by UNESCO (2020) is confirmed in that the participants of this educational level show greater dedication, responsibility and commitment to their training, so that even during confinement they have attended both their work and academic activities. Therefore, this result indicates that postgraduate-level students in administration have sufficient conditions to continue their educational path at a distance, which is confirmed by the direct association with the academic performance obtained in times of COVID-19. In the same way, even after the confinement is concluded, it means that in the future students will be able

to carry out learning activities based on the establishment of a hybrid model that will possibly be implemented in the education sector in the case of the graduate level in Mexico.

In this sense, the present research provides relevant information regarding what is established by both the OECD (2020) and the OEI (2020) regarding the relevance of carrying out studies aimed at determining the effect it has on the academic training of students when migrating from a face-to-face alternative to a virtual one in times of COVID-19. The study also coincides with Yıldızlı (2019) in regard to conceiving the school no longer as the physical place where competences are acquired, but rather that the coronavirus turned the classroom into a virtual environment that implies both greater motivation and responsibility in the student body. For this reason, it was preponderant to determine both their information skills and their self-efficacy oriented towards computational management. This result makes it possible to determine that distance education has been successful at the postgraduate level, so it is relevant to include in the future, within the academic training of the student body, the performance of both synchronous and asynchronous activities mediated by the use of technological tools.

Also, the computational self-efficacy has been recognized as one of the fundamental factors for students to continue with their academic training in times of COVID-19, so a high level was determined for the postgraduate level, and based on Safari, Davaribina and Khoshnevis (2020). This observation implies that the participants have both the belief of being successful and a positive state of mind to face the challenges generated by the presence of the coronavirus. Thus, this finding implies that postgraduate-level students in administration recognize that the coronavirus pandemic has impacted on their personal, academic and work performance, which is why they possess the skills of self-knowledge and self-management that allowed them to reorganize their activities from the beginning of the lockdown. Also, it is relevant to recognize that students have a positive computational self-efficacy that has allowed them to continue with their educational training.

The findings of the study carried out with postgraduate students in administration confirm what was found by Pellas and Kazanidis (2014); Peinado de Briceño and Ramírez (2010b); Bates and Khasawneh (2007) in what refers to the fact that computational self-efficacy is associated with academic performance due to the fact that through the use of digital tools it enables teamwork, as well as the preparation and delivery of academic tasks. In the same way, it agrees with the result obtained by Durndell and Haag (2002) in the existence of a relationship between computational self-efficacy with the time spent on the Internet. The above results allow corroborating the relevance of continuously using technological tools in postgraduate academic training. Thus, its incorporation for the hybrid learning model that will be used in the future is strengthened as a main strategy.

On the contrary, a different finding was found to that established by Peinado de Briceño and Olmedo Casas; Durndell, Haag and Laithwaite (2000); Miura (1987) regarding the level of the computational self-efficacy for gender. These authors investigated that male students obtained a higher score in the computational self-efficacy, whereas the results in this article show the opposite. On the contrary, a different result than that of Krejčová, Chýlová and Michálek (2019) was identified with respect to the fact that females perceived themselves as having a higher level of self-efficacy. Additionally, another different result was the high level for this construct to that reported by Bates and Khasawneh (2007); Pellas and Kazanidis (2014). However, this result coincides with the level of computational self-efficacy by gender found by Peinado de Briceño and Ramírez (2010b) and García, Hernández and Peinado (2009). This result indicates the existence of different levels in computational self-efficacy by gender at the graduate level. So, it will be a main feature to consider in the future for postgraduate academic training.

Besides, what was previously found by Allison (2015), Sánchez Díaz (2012) and Bawden (2002) with regard to the fact that a student is able to recognize his/her information needs, knows how to locate, retrieve, evaluate, organize and use the information to achieve the activity that for this study was to conclude the semester by means of the distance education is confirmed, which is corroborated by the direct and significant association found with academic performance. Thus, this observation coincides with Marzal Martínez et al. (2011) in which information skills are a strategic factor to increase the effectiveness of learning. Also, Solís Valdespino (2013) agrees that postgraduate participants possess the information skills related to determining the nature of an information need; propose effective strategies to search and find information; retrieve information; analyze and evaluate information; integrate, synthesize and use information. However, the respect for intellectual property and copyright has not yet been developed in a consolidated manner. These findings determine the relevance of including information skills in postgraduate academic training, which are important capacities that students possess because during their educational journey they are required for the fulfillment of both learning activities and the preparation of their final degree project.

Therefore, the results of the investigation confirm what was stated by Wang et al. (2020) in regard to the fact that the situation caused by the coronavirus motivated the student body to quickly adapt to distance education to continue with their academic training and thus not be affected in their educational trajectory, which is corroborated by the existence of direct and significant associations of the two study variables with school performance. This finding means that postgraduate-level students possess the skills of adaptability and resilience, which were manifested in the face of the COVID-19 pandemic. Also, the established by Safari, Davaribina and Khoshnevis (2020) is confirmed in that having a high computational self-efficacy allows the participants of the study to be efficient in their performance as postgraduate students, as well as effective to continue their distance academic training during confinement. This result implies the existence of self-regulation and self-knowledge skills in postgraduate level students in administration, which is why they are important capacities that will allow them to face similar situations in the future.

In the same way, the results of the study provide relevant information about the various situations caused by the

coronavirus pandemic in the graduate level participants. The logistical, socio-emotional, educational and technological types stand out. This finding implies the existence of self-control, self-esteem and decision-making skills in students, which are important because they influence academic performance. Finally, the results of the study confirm what is established by Jerónimo and Juárez (2018) and Bailey et al. (2017) in terms of the human capital possessing the competencies to access, select and organize information to create and communicate knowledge, so the postgraduate level is developing it in the student body. Thus, this educational training will have an impact on the organizations in which they work because they will benefit their productivity, innovation and creation of strategic value.

## CONCLUSION

Based on the panorama originated by COVID-19 in which distance education was implemented to continue the academic training of the student body, it was important to carry out a research on two important success factors that influence both academic performance and educational path and which are computational self-efficacy and information skills. Consequently, the general objective of the study was achieved by providing relevant findings on its levels and characteristics in the students of the graduate degrees in administration in terms of gender, semester of study and educational program where the average of the two study variables were high. Also, the study hypothesis was verified as there was a direct and significant association between computational self-efficacy and information skills with academic performance. In the same way, the research provides relevant information on the level of mastery of two variables in the postgraduate programs in administration before the appearance of COVID-19, which were taught in person. So, the findings will allow the design of strategies for academic training for the hybrid model (blended learning) that will be implemented once the confinement is completed. Therefore, the importance of the study is to anticipate that postgraduate students in administration, by managing a high domain in their computational self-efficacy and information skills, will be able to combine face-to-face work with virtual work for their academic training. Also, identifying the level of mastery of the participants of the postgraduate courses in administration in the two variables will allow them as students to have a greater organization and logistics regarding their time, rhythm and learning itinerary.

Nevertheless, the main limitations of the research carried out are the size of the sample because it is focused on the students of the same educational institution and one area of knowledge, as well as the instruments used were the questionnaires to obtain the information. In this sense, it is recommended for future studies to broaden the participants to include students of postgraduate studies from different institutions, as well as to include different areas of knowledge with the intention of comparing the levels of computational self-efficacy and information skills. This is due to the fact that these two terms maintain their relevance within the academic training at the postgraduate level because they allow the identification, selection, organization and evaluation of the information that enables the generation of useful knowledge that can be used in the student body's labor sector.

Furthermore, it is suggested to use the qualitative approach in order to collect the testimonies of the participants regarding their experience in the distance academic process in times of COVID-19. The foregoing with the intention of identifying the causes and consequences experienced by graduate level students to determine educational intervention strategies oriented towards their care during the pandemic and the post-pandemic period. In this sense, the academic training of the student body will continue in parallel with the socio-emotional component in order to successfully complete the educational path.

## ACKNOWLEDGMENT

This article was supported by the Instituto Politécnico Nacional, México under the "Educational leadership for sustainable organizational development in the new normal (SIP20210598)".

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