

ORIGINAL ARTICLE

THE COMPETENCE OF UNIVERSITY STUDENTS AND FACTORS RELATED TO LEARNING MOTIVATION DURING THE COVID-19 PANDEMIC: A CROSS-SECTIONAL STUDY IN FINLAND AND AUSTRIA

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ABSTRACT

The global coronavirus disease (COVID-19) has disturbed daily life and altered the way we interact with others and the urgency of learning motivation/competence and its relation to the pandemic has not been addressed. Thus, few studies have been conducted to assess factors related to learning motivation from the COVID-19 pandemic. The current study aims to examine the related learning motivation of university students during the COVID-19 pandemic. A cross-sectional was used as secondary data analysis from Inter-university Consortium for Political and Social Research. A total of 7,386 university students in Austria and Finland. The data was administered by a web-based survey that was conducted from April 7 to June 6, 2020. Data analysis comprised of descriptive analysis and multiple linear regression analysis. This study found that most of students were female ($n = 5,264, 73.30\%$), students' age $M = 25.76, SD = 7.52$, and students from Austria (77.80%) and Finland (22.2%). The predictors of learning motivation were age ($B: -0.099, <0.05$) and learning competence ($B: .659, <0.05$). This study also asserted that age ($B: -.85, p < .05$) was statistically significant with learning competence during COVID-19. Interdisciplinary healthcare team and faculty members consider students' age, gender, and learning competence factors in developing appropriate activities to encourage learning competence and learning motivation in order to improve learning outcomes in university students during the COVID-19 outbreak.

Keywords: Learning competence and motivation; university students; COVID-19; secondary data

INTRODUCTION

The global coronavirus disease (COVID-19) has disturbed daily life and altered the way we interact with the environment and others. Especially, the educational system has changed because it is difficult to continue lectures as usual and in-person classes¹⁻². The COVID-19 circumstance is a significant turning point for education management. There has to be a large conceptual shift that must align and connect students to higher learning. Furthermore, previous studies present psychological characteristics associated with university students' well-being during the pandemic³⁻⁵. Findings on the satisfaction of basic psychological needs (experience competence) can help in predicting learning motivation. Accordingly, the result from data set analysis can illustrate the relationship between need satisfaction and self-regulated learning and well-being.

Competence, in this context, is related to the student's performance when faced with unpredictable and complex situations, such as problems with learning competence in university settings during an emergency, specifically that of the COVID-19 pandemic. Competencies, especially in unusual situations like the switch to distance

learning and virtual simulation during COVID-19, impacted student's perception and knowledge⁶⁻⁸ and may have influenced university student learning outcomes and academic performance⁹⁻¹⁰. As a long with the online learning during the COVID-19 pandemic, in university learning situations and teaching methods students needed to encourage their learning motivation and allow them to perform their learning outcome.

Many colleges and universities around the world have been concerned about student competence, knowledge, and their ability to use online learning during the COVID-19 pandemic¹¹⁻¹². It is important to engage in learning competence and/or learning motivation from an online learning environment according to the unprecedented COVID-19 pandemic. Overall, COVID-19 and its containment measures have created unique challenges for mental health. To counteract negative developmental outcomes, resources that promote resilience in times of crisis must be identified. Therefore, the current study aimed to examine factors related to the learning motivation of university students during the COVID-19 pandemic. Our findings may, therefore, serve as a guide to

developing interventions and encouraging university students' learning motivation and motivation during the COVID-19 crisis to prepare them to be prepared about the new environment in this unprecedented situation.

METHODS

Study design

This cross-sectional study used secondary data from Inter-university Consortium for Political and Social Research (ICPSR) ¹³. The data set was collected from April 2020 to June 2020 in Austria and Finland, from university students who experienced learning changes during COVID-19. The primary research used convenience sampling. Students aged over or equal to 18 years with they can access to the computer were invited to participate in the study. The sample size was 6,071 students in Austria and 1,653 students from Finland. Considering, that the total questionnaires were 7,724, but the possibility of 4 % invalid, this study included 7,386 in the final sample for analysis.

Research Instruments

Learning Competence Scale (LCS)

The LCS was measured with three items adapted by Van den Broeck et al,¹⁴ and Holzer et al,¹⁵. The LCS was assessed during COVID-19 that stated, "Currently, I am dealing well with the demands of my studies". A correct answer was assigned the rating scale ranges "1 = strongly" to "5 = strongly disagree". Cronbach's alpha coefficient was .84.

Intrinsic Learning Motivation Scale (ILMS)

The ILMS was assessed with three items slightly adapted by Thomas et al,¹⁶ and Holzer et al,¹⁷. Sample item of the ILMS: "Currently, I am really enjoying studying and doing work for university." A correct answer was assigned the rating scale ranges "1 = strongly" to "5 = strongly disagree". Cronbach's alpha coefficient was .90.

Sociodemographic Variables

The demographic questionnaire consisted of three items with multiple choices and open-ended

questions including students' age, gender, and country of university.

Data collection

This study performed a secondary analysis. In the primary research design, the researchers implemented self-report online questionnaires by referring to Higher Education in Times of COVID-19. The data was collected by sharing an online questionnaire via a web-based survey on several networking platforms, for example, students' e-mails.

Statistical Analysis

A correlation analysis is performed on the data set using SPSS 20.0, with $p < .05$ considered statistically significant (two-tailed). This research used both descriptive analysis and inferential analysis. Descriptive statistic was used to present characteristic of university's students, including gender, age, and country of living. Then, multiple linear regression model was used to address the main research question which identify the relationship between different independent variable and the outcome (dependent) variable of learning motivation total score. This research was tested the diagnostic for multiple linear regression. The collinearity is not presented in this data set. The variance Inflation Factor (VIF) is 1, and it is not greater than 4. Moreover, the linearity, as seen on the scatterplot between standardized predicted values and standardized residual value shows not trend away from linearity, which means the linearity assumption is met.

RESULTS

Descriptive Characteristic Results

A total of 7,724 questionnaires were collected via the internet, and 7,386 questionnaires were completed with a response rate of 95%. The 7,386 participants were from Finland and Austria with 77.8% (n= 5,743), and 22.2% (n= 1,643), respectively. In total, 5,264 was female (71.3%), and 2,068 was male (28.0%). The distribution of age, gender, and country are presented in table 1.

Table 1 Demographic Characteristic of the participants (n = 7,386)

Demographic Characteristics		Number of participants (%)
Age (years)	18-24	4260 (57.7%)
	25-35	2378 (32.2%)
	> 36	748 (10.1%)
Gender	Female	5264 (71.3%)
	Male	2068 (28.0%)
	Other	54 (.7%)
Country	Austria	5743 (77.8%)
	Finland	1643 (22.2%)

The Correct rate of learning competence and learning motivation

The scores of competencies and learning motivation were 2.65 ± 1.019 and 3.08 ± 1.127 , respectively. Table 2 shows that two-thirds (60.8 %) of competence agree and somewhat agree that students can be dealing with the demand of their studies. Furthermore, about three-fifth (54.3%) of university students doubts whether they are capable of doing well in their study during COVID-19. A similar percentage of 56.8% also agree and somewhat agree that they can make progress in studying for university during the pandemic.

Concerning learning motivation, two-thirds of participants disagree that learning during COVID-19 is fun, enjoyable, and exciting (37.9%, 40.2%, and 38.9%, respectively). In contrast, 10.4 %, 10.7%, and 10.7 % strongly agree that currently doing work for university is really fun, enjoying studying and doing work for a university, and studying for university is really exciting during COVID-19. About two-third (50 %) in each item’s category agree that the learning motivations are fun, enjoyable, and exciting.

Table 2: Learning competence and learning motivation during COVID-19 among University’s students (n = 7,386)

Items	Mean	SD
Learning competence		
Currently, I am dealing well with the demands of my study	2.7593	1.138
Strongly agree	947 (12.8%)	
Agree	2439 (33.0%)	
Somewhat agree	2055 (27.8%)	
Disagree	1335 (18.1%)	
Strongly disagree	610 (8.3%)	
Currently, I have no doubts about whether I am capable of doing well in my studies.	2.5386	1.226
Strongly agree	1729 (23.4%)	
Agree	2281 (30.9 %)	
Somewhat agree	1619 (21.9%)	
Disagree	1183 (16.0 %)	
Strongly disagree	574 (7.8 %)	
Currently, I am managing to make progress in studying for university	2.6645	1.193
Strongly agree	1352 (18.3%)	
Agree	2232 (30.2%)	
Somewhat agree	1966 (26.6%)	
Disagree	1214 (16.4%)	
Strongly disagree	622 (8.4 %)	
Learning motivation		
Currently, doing work for university is really fun.	3.0646	1.215
Strongly agree	769 (10.4%)	
Agree	1857 (25.1%)	
Somewhat agree	1958 (26.5%)	
Disagree	1732 (23.4%)	
Strongly disagree	1070 (14.5%)	
Currently, I am really enjoying studying and doing work for university.	3.1103	1.236
Strongly agree	792 (10.7%)	
Agree	1738 (23.5%)	
Somewhat agree	1887 (25.5%)	
Disagree	1801 (24.4%)	
Strongly disagree	1168 (15.8%)	
Currently, I find studying for university really exciting.	3.0917	1.223
Strongly agree	790 (10.7%)	
Agree	1730 (23.4%)	
Somewhat agree	1995 (27.0%)	
Disagree	1755 (23.8%)	
Strongly disagree	1116 (15.1%)	

The Influencing factors of learning competence and learning motivation

The results of univariate analysis showed that competence and learning motivation during COVID-19 were significantly different among different groups by age, gender, and country ($p < 0.05$). After controlling confounding factors in multiple linear regression analyses; Table 3 showed that the predictors of the learning motivation with the

gender ($B: 0.018, p > 0.05$) were not significantly predict learning motivation. Regarding the total learning motivation, age ($B: -0.099, < 0.05$) and learning competence ($B: .659, < 0.05$) were significant associations with learning motivation. The results also showed that gender ($B: 0.42, p > 0.098$) was not associated with competence, but age ($B: -0.85, < 0.05$) was associated with learning competence during COVID-19, as shown in Table 4.

Table 3: Multiple linear regression analysis of learning motivation during COVID-19 and related factors

Construct	Learning motivation				
Variable	B	SE	Beta	t	p
Constant	1.472	.046		32.342	0.000
Gender	.018	.022	.002	.795	.427
Age	-.099	.013	-.069	-7.393	.000
Learning competence	.659	.010	.592	64.095	.000

* $P < 0.05$; $F = 1414.900, P = 0.000, R^2 = 0.365, adjusted R^2 = .365$; adjusted R^2 indicated that equation had a predicted accuracy 36.5 %

The model summary table shows the adjusted $R^2 = 0.365$ with $R^2 = 0.361, F(3, 7386) = 1414.90, p < 0.001$. The linear regression model explains 36.5% of the variance in the data, which means 36.5 % of the learning motivation outcomes are unexplained. The coefficient table shows the multiple linear regression approximations along with the intercept and the significance levels. As shown in the table coefficient above, only gender variable does not significantly predict learning motivation scores, $t(7386) = .795, p = .427$. In contrast, the other two

predictor variables (age and learning competence) were significantly related to students learning motivation. Overall, learning motivation scores were highly predictable from this set of predictors; the strongest unique predictive contribution was from age and learning competence, with a smaller contribution from gender. Furthermore, gender was not significantly predictive of success in stimulating learning motivation during the COVID-19 pandemic.

Table 4. Factor significantly associated with learning competence during COVID-19

Construct	Competence				
Variable	B	SE	Beta	t	p
Constant	2.733	.041		67.401	0.000
Gender	.042	.025	.019	1.655	.098
Age	-0.85	.015	-0.66	-5.650	.000

* $P < 0.05$; $F = 16.733, P = 0.012, R^2 = 0.000, adjusted R^2 = .004$; adjusted R^2 indicated that equation had a predicted accuracy 4 %

DISCUSSION

The results of our study showed that most of the participants were female (71.3%), and 77.8% were from Finland. For learning competence and concerning learning motivation, most of the participants somewhat agree to agree on each category strongly. For example, they can be dealing with the demands of their study. This can be explained that the COVID-19 crisis has caused tremendous psychological health such as stress and anxiety in university students.⁴ Since COVID-19 was found in December 2019, students experienced this disease, and they also learned from the new classroom teaching (e.g., online learning) based on the university policy, which is suitable for them that arise during this time.¹⁰⁻¹² In addition, by making

disease conditions more visible, more realistic e-learning cases with multimedia elements as real-life scenarios helped to improve students' learning competency and motivation.¹⁸

This study found that gender, age, and learning competency were significantly associated with their learning motivation. This study also asserted factors predicting learning motivation among university students in Finland and Austria during the COVID-19 outbreak and found them to be gender, age, and learning competency that could predict learning motivation in university students. The first predicted learning motivation among university students in Finland and Austria during the COVID-19

outbreak was gender. Currently, gender differences in educational institute outcomes have received much attention¹⁹; therefore, the consensus is that overall female students do better in university or educational institutes²⁰⁻²¹. The results of our study are similar to Korlat et al,²² who conducted the gender differences in digital learning among 19,190 Austrian secondary school students during the COVID-19 pandemic. They found gender differences with several variables such as higher intrinsic value ($F(1, 19157) = 89.50, p < 0.001, \eta^2p = 0.005$) and learning engagement among female students than male students ($F(1, 19157) = 47.21, p = 0.000, \eta^2p = 0.002$). Rodriguez-Besteiro et al,²³ also found gender differences between male and female Spanish university students in terms of perception of danger to the coronavirus disease 2019, which was females than males. In line with Stoet and Geary²⁰ who found that 70% of females' overall educational achievement is better than males' in terms of studied countries and economic regions.

The second factor that predicted learning motivation among university students in Finland and Austria during the COVID-19 outbreak was age. This research found that university students' age was 25.76 ± 7.52 (Mean \pm SD). To explain this, additional age-related differences were reflected in the way that our basis proportion of understudies' persuaded learning behaviour demonstrated critical contrasts. Our results are consistent with Kormos and Csizér²⁴ who found that adult learners and university students had altogether higher scores on the motivated learning behaviour; that is, university students were able to put more exertion on learning, and also continued longer, as well as language learning itself was more significant in their lives than other students such as secondary school students. A previous study also confirmed that female students had higher achievement motivation and self-determination when compared to male students²⁵. However, mature students are episodically thought to be more anxious about new innovation and technology than more youthful understudies, to the degree that students try not to utilize new innovation and technology²⁶. During the COVID-19 crisis, the utilization of technology is a ceaselessly evolving, developing, and dynamic field, with university students body being a changing cohort, it is essential to lead a state-of-the-art investigation in technology attitude between university and younger students²⁶.

Additionally, a factor that can predict learning motivation among university students in Finland and Austria during the COVID-19 outbreak was learning competence. Distance learning of students during the COVID-19 pandemic requires high learning competency and intrinsic motivation as well as carries the risk of passive procrastination. Previous

studies asserted that learning competence was associated with learning motivation in university students during the COVID-19 outbreak ($p < .001$)¹⁵⁻²⁷. Our finding is consistent with Zainuddin²⁸ who found that learning performance was associated with perceived motivation in the science course for students in Indonesia. Based on our findings, students were more intrinsically motivated when they experienced feelings of perceived competence; they became independent learners, self-regulated learning, and took responsibility for their learning, particularly during the COVID-19 pandemic.

Strengths and limitations

The current study has numerous prominent strengths. The first strength is that the primary study used validated and standardized instruments for assessing eligible university students in both Finland and Austria. Second, our study looks at a relatively large sample ($n = 7,386$), and focused on learning competence, learning motivation, and related factors related to learning motivation in university students during the COVID-19 in Finland and Austria. This is indicative of the positive correlation between age and the number of students present in this study. However, our study also has several limitations that warrant discussion. First, this study was a cross-sectional study; it given the observational nature of this study, causal inferences for any reported associations cannot be drawn. Second, this study assessed socio-demographic characteristics in three variables, such as age, gender, and country; it would be more informative if the year in school, grade point average (GPA), students' major or field, family's income, and belief in online distance learning could be included, which a significant effect on the students' learning motivation. Third, this study performed secondary data with self-reported; it is susceptible to recall bias. The data was conducted via online survey with students who can access to the computer were invited to participants in the study. This research cannot distinguish between users who respond original questionnaire and users who respond to others' questionnaire; there are common within studies relying on a secondary analysis of nationally representative data.

CONCLUSION

The present study including a cohort of students from Finland and Austria universities revealed that age, gender, and learning competence were predicted learning motivation among university students during the COVID-19 outbreak. Although distance learning in this circumstance demonstrates challenges for students; however, the most critical thing for professors, teachers, and students in preparation is to develop activities, effective

concepts, and new technology for successful future blended or online learning. Healthcare providers should also promote both psychically and psychologically to cope during the COVID-19 crisis.

Ethical Consideration

In the primary study, the Federal Ministry for Education, Science, and Research approved the study, and written informed consent was obtained from all participants^{15,17}. For the current study, an Institutional Review Board (IRB) approval for a waiver of informed consent was obtained by the IRB at Saint Louis University, Missouri, USA.

Data Sharing Statement

The datasets generated during and/or analyzed during the current study are available from the ICPSR; <https://doi.org/10.3886/E133601V1>.

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REFERENCES

1. Choompunuch B, Suksatan W, Sonsroem J, Kutawan S, In-udom A. Stress, adversity quotient, and health behaviors of undergraduate students in a Thai university during COVID-19 outbreak. *Belitung Nursing Journal*. 2021;7(1):1-7.
2. Bao W. COVID-19 and online teaching in higher education: A case study of Peking University. *Human Behavior and Emerging Technologies*. 2020;2(2):113-115.
3. Wei H-C, Chou C. Online learning performance and satisfaction: do perceptions and readiness matter? *Distance Education*. 2020;41(1):48-69.
4. Suksatan W, Choompunuch B, Koontalay A, Posai V, Abusafia AH. Predictors of Health Behaviors Among Undergraduate Students During the COVID-19 Pandemic: A Cross-Sectional Predictive

- Study. *J Multidiscip Healthc*. 2021;14:727-734.
5. Marler EK, Bruce MJ, Abaoud A, et al. The impact of COVID-19 on university students' academic motivation, social connection, and psychological well-being. *Scholarship of Teaching and Learning in Psychology*. 2021:Advance online publication.
6. Ma L, Lee CS. Drivers and barriers to MOOC adoption: perspectives from adopters and non-adopters. *Online Information Review*. 2020;44(3):671-684.
7. Heidari E, Mehrvarz M, Marzooghi R, Stoyanov S. The role of digital informal learning in the relationship between students' digital competence and academic engagement during the COVID-19 pandemic. *Journal of Computer Assisted Learning*. 2021;37(4):1154-1166.
8. Villela EFM, de Oliveira FM, Leite ST, Bollela VR. Student engagement in a public health initiative in response to COVID-19. *Med Educ*. 2020;54(8):763-764.
9. Kim S, Jeong SH, Kim HS, Jeong YJ. Academic Success of Online Learning in Undergraduate Nursing Education Programs in the COVID-19 Pandemic Era. *Journal of Professional Nursing*. 2022;38:6-16.
10. Limniou M, Varga-Atkins T, Hands C, Elshamaa M. Learning, Student Digital Capabilities and Academic Performance over the COVID-19 Pandemic. *Education Sciences*. 2021;11(7).
11. Sokolowich JR, Ferguson PE, Hendricks KR. Taking the Temperature of Distance Learners: Does University Climate Influence Perceptions of Belonging in a Distance Education Environment? *Nursing Education Perspectives*. 2022;43(3).
12. Stevanović A, Božić R, Radović S. Higher education students' experiences and

- opinion about distance learning during the Covid-19 pandemic. *Journal of Computer Assisted Learning*. 2021;37(6):1682-1693.
13. Holzer J, Lüftenegger M, Korlat S, et al. Higher Education in Times of COVID-19: University Students' Basic Need Satisfaction, Self-Regulated Learning and Well-Being. Ann Arbor, MI: Inter-university Consortium for Political and Social Research. <https://doi.org/10.3886/E133601V1>. Published 2021. Accessed December 10, 2021.
 14. Van den Broeck A, Vansteenkiste M, De Witte H, Soenens B, Lens W. Capturing autonomy, competence, and relatedness at work: Construction and initial validation of the Work-related Basic Need Satisfaction scale. *Journal of Occupational and Organizational Psychology*. 2010;83(4):981-1002.
 15. Holzer J, Lüftenegger M, Korlat S, et al. Higher Education in Times of COVID-19: University Students' Basic Need Satisfaction, Self-Regulated Learning, and Well-Being. *AERA Open*. 2021a;7:23328584211003164.
 16. Thomas AE, Müller FH, Bieg S. Entwicklung und Validierung der Skalen zur motivationalen Regulation beim Lernen im Studium (SMR-LS). *Diagnostica*. 2018;64(3):145-155.
 17. Holzer J, Lüftenegger M, Käser U, et al. Students' basic needs and well-being during the COVID-19 pandemic: A two-country study of basic psychological need satisfaction, intrinsic learning motivation, positive emotion and the moderating role of self-regulated learning. *International Journal of Psychology*. 2021b;56(6):843-852.
 18. Rahm A-K, Töllner M, Hubert MO, et al. Effects of realistic e-learning cases on students' learning motivation during COVID-19. *PLOS ONE*. 2021;16(4):e0249425.
 19. King RB. Gender differences in motivation, engagement and achievement are related to students' perceptions of peer—but not of parent or teacher—attitudes toward school. *Learning and Individual Differences*. 2016;52:60-71.
 20. Stoet G, Geary DC. Sex differences in academic achievement are not related to political, economic, or social equality. *Intelligence*. 2015;48:137-151.
 21. Fryer LK, Bovee HN. Supporting students' motivation for e-learning: Teachers matter on and offline. *The Internet and Higher Education*. 2016;30:21-29.
 22. Korlat S, Kollmayer M, Holzer J, et al. Gender differences in digital learning during COVID-19: Competence beliefs, intrinsic value, learning engagement, and perceived teacher support. *Frontiers in Psychology*. 2021;12(849).
 23. Rodriguez-Besteiro S, Tornero-Aguilera JF, Fernández-Lucas J, Clemente-Suárez VJ. Gender differences in the COVID-19 pandemic risk perception, psychology, and behaviors of Spanish university students. *International Journal of Environmental Research and Public Health*. 2021;18(8):3908.
 24. Kormos J, Csizér K. Age-related differences in the motivation of learning English as a foreign language: Attitudes, selves, and motivated learning behavior. *Language Learning*. 2008;58(2):327-355.
 25. Vartanova II. Specifics of the relationship between motivation and values in high school students of different sex and age. *Psychological Science and Education*. 2018;23(6):67-74.
 26. Staddon RV. Bringing technology to the mature classroom: Age differences in use and attitudes. *International Journal of Educational Technology in Higher Education*. 2020;17(1):11.

27. Pelikan ER, Lüftenegger M, Holzer J, Korlat S, Spiel C, Schober B. Learning during COVID-19: the role of self-regulated learning, motivation, and procrastination for perceived competence. *Zeitschrift für Erziehungswissenschaft*. 2021;24(2):393-418.
28. Zainuddin Z. Students' learning performance and perceived motivation in gamified flipped-class instruction. *Computers & Education*. 2018;126:75-88.