https://doi.org/10.36315/2023inpact131
Psychological Applications and Trends 2023

GENERAL AND TECHNOLOGY SELF-EFFICACY AMONG UNIVERSITY STUDENTS - PRELIMINARY FINDINGS

Tatiana Pethö, & Miroslava Bozogáňová
Institute of Social Sciences CSPS SAV (Slovakia)

Abstract

Self-efficacy is an essential part of an individual in various areas of both work and personal life. According to Wood and Bandura (1989), self-efficacy is defined as "beliefs in one's capabilities to mobilize the motivation, cognitive resources, and courses of action needed to meet given situational demands" (p. 408). A specific area in the study of self-efficacy is the area of computer self-efficacy and the related. Authors Gupta and Bostrom (2019) state that computer self-efficacy is currently "one of the most important constructs in information systems research" (p. 71). The ability to work with computers and improves the individual's employability in the labour market, and, for this reason, technology self-efficacy is the subject of our research. The aim of the study is to assess the level of general and computer self-efficacy among university students in relation to gender, age, perceived social strata and the time spent at the computer.
The research sample consisted of 171 university students (70.76% females) aged 17-27 years (M=20.14, SD=1.85) of teaching disciplines (65.5%) and management (34.5%) of the University of Prešov (Slovakia). The data were collected online.
General self-efficacy was measured by the New General Self-efficacy scale (Chen, Gully, Eden, 2011), Technology self-efficacy by Brief Inventory of Self-efficacy (BITS) by Weingold and Weingold (2021). Based on the score obtained in the BITS, the respondents are divided into three groups (novice, advanced and expert), according to their level of computer self-efficacy.
Moderate positive relationships were demonstrated between perceived social class and self-efficacy, between self-efficacy and Novice and Advanced levels of technology self-efficacy. Differences were found between male and female students at the advanced and expert levels of the technology self-efficacy framework. Female students reported lower mean self-efficacy than male students. The research findings are consistent with the Acceptance Model (TAM), gender differences in the level of technology self-efficacy were also supported by previous research findings. Limitations include a homogeneous sample in terms of age and the factor of experience using , which was measured by a single item.

Keywords: *General self-efficacy, technology self-efficacy, university students.*

1. Introduction

For a number of years, the need to increase the interest of high school and university students in careers in mathematics and science has been emphasised. Application on the labour market requires the ability to work with computers and technologies, which will subsequently ensure an adequate job position for the person, even in a non-technical field. While technical skills are important, it is also important to examine self-belief. Self-efficacy is an essential part of an individual in various areas of both work and personal life. According to Wood and Bandura (1989), self-efficacy is defined as "beliefs in one's capabilities to mobilize the motivation, cognitive resources, and courses of action needed to meet given situational demands" (p. 408). According to Bandura (1997), self-efficacy is understood as an individual's belief in their own ability to organise and decide on the next course of action needed to resolve a prospective situation. Thus, social cognitive theory and self-efficacy are significantly related to the study of and with beliefs that predict the user's attitude towards the , which in turn predicts acceptance and actual use (Davis, 1993). Based on the theory, Locke et al. (1984) suggest that people with a higher levels of self-efficacy will be more engaged in using and the associated activities, and will make greater efforts to learn new activities that are associated with the use of .

A specific area of self-efficacy research is the area of computer self-efficacy and the related. Authors Gupta and Bostrom (2019) state that computer self-efficacy is currently "one of the most

important constructs in information systems research" (p. 71). The level of proficiency of university students in using is also an important variable for educators to consider when designing and implementing -rich courses. It is recognised that mastery of any requires effort (Girasoli, Hannafin, 2008). Isman and Celikli (2009) note that many students enter college or work without basic computer skills. Due to this fact, Gist and Mitchell (1992) state that the lack of experience with directly affects the level of technology self-efficacy. In Vekiri and Chronaki's research (2008), technology self-efficacy was found to be a significant predictor of future academic performance and career path among university students. Based on the above, it is necessary to pay attention to the level of general and technology self-efficacy in the context of gender and other variables.

2. Aim

The aim of the study is to assess the level of general and technology self-efficacy among university students in relation to gender, age, perceived social strata and time spent at the computer.

3. Methods

The Brief Inventory of Self-efficacy (BITS) (Weigold & Weigold, 2021) assesses computer self-efficacy (CSE). The BITS is an 18-item measure with one score each for its three subscales (Novice (ω = 0.962), Advanced (ω = 0.775), and Expert (ω = 0.842), whereas the BITS-SF is a six-item measure with one total score indicating where people fall on the novice to expert continuum, where 1 = not at all confident - 6 = completely confident.

The New General Self-Efficacy Scale (Chen, Gully & Eden, 2001) assesses the extent to which people believe they can achieve their goals, despite difficulties. Using a 5-point rating scale (1= strongly disagree; 3 = neither agree nor disagree; 5 = strongly agree), respondents indicate how much they agree with eight statements, such as "*Even when things are tough, I can perform quite well.*" To calculate the total score for each respondent, the average rating of the items was computed by adding respondents' responses to each item and dividing this sum by the total number of items (McDonald's ω = 0.906).

Perceived social strata were measured by a single item: Our society is divided into different social strata - upper, middle, lower. Where would you place yourself on the following 10-degree scale expressing social strata - with ten representing the highest and one representing the lowest social strata?

Computer time was measured by a single item: I spend an average of a day behind the computer... (specify number of hours), where respondents wrote the number of hours.

4. Research sample

The research sample consisted of 171 respondents (70.76% female) aged 17-27 years (M=20.14, SD=1.85). 64.33% were 1st year B.Sc. students, 24.56% were 2nd year B.Sc. and 11.11% were 3rd year students of B.Sc. of teaching disciplines (65.5%) and management (34.5%) of the University of Prešov (Slovakia). The data were collected online from December 2022 to February 2023.

5. Results

First, we report the descriptive characteristics of the variables of interest. The mean level of perceived social stratum was 5.87 (SD = 1.429). The average time spent on the computer in the research sample was 3.398 hours (SD = 2.051) per day (minimum = 0 hours, maximum = 12 hours). Other results are presented in Table 1.

Table 1. Descriptive characteristics.

	N	M	SD	Min	Max
Self-efficacy	171	3.817	0.729	1.250	5.000
Novice	171	5.665	0.834	2.667	6.000
Advanced	171	4.005	1.141	1.000	6.000
Expert	171	2.239	1.059	1.000	6.000

As we can see, students perceive themselves as more self-efficacious (M = 3.817, SD = 0.729). In terms of technology self-efficacy, at the Novice level they are on average completely confident (M = 5.665, SD = 0.384), at the Advanced level the level is slightly lower (M = 4.005, SD = 1.141). At the Expert level, they are rather unconfident (M = 2.239, SD = 1.095).

Further, we were interested in the existence of a relationship between self-efficacy, self-efficacy, and age, time spent at the computer, and perceived social stratum. Pearson's correlation coefficient was used. The results are reported in Table 2.

Table 2. Correlation matrix

Variable	Age		Perceived social strata		Computer time	Self - efficacy		Novice		Advanced	
1. Age	—										
2. Perceived social strata	-0.111		—								
3. Computer time	-0.037		-0.012		—						
4. Self-efficacy	-0.173	*	0.334	***	-0.092	—					
5. Novice	-0.051		0.072		0.042	0.327	***	—			
6. Advanced	-0.013		0.129		0.054	0.250	***	0.478	***	—	
7. Expert	-0.156	*	0.053		0.100	0.089		0.113		0.590	***

* p < 0.05, ** p < 0.01, *** p < 0.001

A weak negative significant relationship was found between age and self-efficacy (r = - 0.173, p < 0.05) and Expert level in technology self-efficacy(r = - 0.156, p < 0.05). Given the strength of the relationship, we interpret these findings with caution - rather it is a lack of relationship. Moderate positive relationships were demonstrated between perceived social class and self-efficacy (r = 0.334, p < 0.001) - the more one perceives oneself as a member of a higher social class, the higher the level of self-efficacy, and vice versa. Finally, moderate positive relationships between self-efficacy and levels of Novice (r = 0.327, p < 0.001) and Advanced (r = 0.250, p < 0.001) technology self-efficacy were found. The higher the level of self-efficacy a student has, the higher the level of technology self-efficacy at the Novice and Advanced levels and vice versa. There were no relationships between the other variables (p > 0.05).

Finally, we compared male and female students in terms of their level of self-efficacy and technology self-efficacy (novice, advanced, expert). We used the Mann - Whitney U-test (due to the unequal representation of males and females in the research sample - which is a logical condition, however, when studying teaching disciplines at university, females are more prevalent). The results are reported in Table 3.

Table 3. Comparison of male and female students in self-efficacy and technology self-efficacy.

	Group	N	M	SD	W	p	Rank-Biserial Correlation
Self-efficacy	men	50	3.763	0.851	2950.500	0.801	-0.025
	women	121	3.840	0.676			
Novice	men	50	5.413	1.133	2837.000	0.411	-0.062
	women	121	5.769	0.651			
Advanced	men	50	4.290	1.180	3619.000	0.044*	0.196
	women	121	3.887	1.107			
Expert	men	50	2.620	1.239	3825.500	0.006**	0.265
	women	121	2.081	0.935			

* p < .05, ** p < .01

Based on the results, differences were shown between male and female students at the advanced (W = 3619.000, p = 0.044, Rank-Biserial Correlation = 0.196) and expert (W = 3825.500, p = 0.006, Rank-Biserial Correlation = 0.265) levels in the technology self-efficacy framework. Female students reported lower mean self-efficacy than male students. There were no differences between male and female students in self-efficacy and novice level technology self-efficacy.

6. Discussion and conclusion

The aim of the study was to assess the level of general and technology self-efficacy among university students in relation to gender, age, perceived social strata and time spent at the computer. Female students reported lower mean technology self-efficacy than male students, which is in line with previous research (Coffin & MacIntyre, 1999; Whitley, 1997). A weak negative significant relationship was found between age and self-efficacy, which is not in accordance with the previous findings of Lim (2001), who demonstrated a significant relationship between age, frequency of computer use in relation to self-efficacy. Our findings may be limited by the homogeneous age group of university students.

General self-efficacy among university students was positively correlated with the level of technology self-efficacy at the Novice and Advanced levels, which consistent with the Acceptance Model (TAM), which describes the extent to which individuals are able to use with minimal effort (Holden, Council, 2011). This means that if a person has a high level of belief (general self-efficacy) in being able to use , their ability to use will also be at a high level (technology self-efficacy). It is also important to consider the experience factor, which was measured by the time an individual spends at the computer each day.

Based on the research results, it was found that, the more one perceives oneself as a member of a higher social class, the higher the level of self-efficacy has, while our research findings can also be supported by previous research in the career literature (Thompson & Dahling, 2012; Thompson & Subich, 2011). Belief in one's own abilities is also an important element in the assessment of perceived social strata.

Limitations of the study are that our research used self-report data that were collected at one point in time and participants were approximately the same age, which may affect the correlation between age and self-efficacy. The experience factor was measured by only a single item, which can be considered as an insufficient validation of experience. Preliminary research findings are part of further research focusing on technology self-efficacy and selected psychological attributes in the STEM field.

Acknowledgments

VEGA 2/0146/22- Psychological constructs and contextual frameworks determining the intention of girls and women to study ICT fields.

References

Bandura, A. (1997). *Self-Efficacy: the exercise of control.* New York: W.H.Freeman and Company

Coffin, R. J., & MacIntyre, P. D. (1999). Motivational influences on computer related affective states. *Computer in Human Behavior, 15*, 549- 569.

Davis, F. (1993). User acceptance of information: system charac-teristics, user perceptions and behavioral impacts. *International Journal of Man-Machine Studies, 38*, 475-487.

Giralosi, A. J., & Hannafin, R. D. (2008). Using asynchronous AV communication tools to increase academic self-efficacy. *Computers & Education, 51(4)*, 1676- 1682.

Gist, M. E., & Mitchell, T. R. (1992). Self- efficacy: A theoretical analysis of its determinants and malleability. *The Academy of Management Review, 17*, 183- 211.

Holden, H., & Rada, R. (2011). Understanding the influence of perceived usability and self- efficacy on teachers´ acceptance. *Journal of Research on in Education, 43(4)*, 343- 367.

Chen, G., Gully, S. M., & Eden, D. (2001). Validation of a New General Self-Efficacy Scale. Organizational *Research Methods, 4(1),* 62–83.

Isman, A., & Celikli, G. E: (2009). How does student ability and self- efficacy affect the usage of computer? *The Turkish Journal of Educational, 8*, 33-38.

Lim, C. K. (2004). Computer self- efficacy, academic self- concept, and other predictors of satisfaction and future participation of adult distance learners. *American Journal of Distance Education, 15(2)*, 41-51.

Locke, E., Frederick, E., Lee, C., & Bobko, P. (1984). Effect of self efficacy, goals and task strategies on task performance. *Journal of Applied Psychology, 69*, 241–251.

Thompson, M. N., & Dahling, J. J. (2012). Perceived social status and learning experiences in social cognitive career theory. *Journal of Vocational Behavior, 80(2)*, 351-361.

Thompson, M. N., & Subich, L. M. (2011). Social status identity: Antecedents and vocational outcomes. *The Counseling Psychologist, 39(5)*, 735-763.

Veriki, I., & Chronaki, A. (2008). Gender issues in use: Perceived social support, computer self- efficacy and value beliefs, and computer use beyond school. *Computers and Education, 51*, 1392-1404.

Weigold, A. & Weigold, I. K. (2021). Measuring confidence engaging in computer activities at different skill levels: Development and validation of Brief Inventory of Self- Efficacy (BITS). *Computers & Education, 169*, 1-14.

Whitley, B. E. (1997). Gender differences in computer-related attitudes and behavior: A meta-analysis. *Computers in Human Behavior, 13*, 1-22.