



ARE PEDAGOGICAL STUDENTS MORE CREATIVE THAN STUDENTS OF NON-PEDAGOGICAL PROGRAMS?

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Abstract/Izvleček The study aims to explore whether there are significant differences in self-assessed creativity between pedagogical and non-pedagogical students, the potential connection between creativity and pedagogical or non-pedagogical study orientation, whether the pedagogical or non-pedagogical orientation of studies influences creativity, and additionally whether there are significant differences in self-assessed creativity between the genders, related to the results of creativity self-assessment. The results showed no statistically significant differences in creativity between students according to gender or according to whether they were pedagogical or non-pedagogical students. We can conclude that the expression of creativity is likely to be influenced by many other factors.

Ali so študenti pedagoških študijskih smeri bolj ustvarjalni kot študenti nepedagoških študijskih smeri?

V raziskavi nas je zanimalo, ali obstajajo pomembne razlike v samooceni ustvarjalnosti med pedagoškimi in nepedagoškimi študenti, prav tako smo raziskali ali obstajajo pomembne razlike v samooceni ustvarjalnosti med spoloma. Prilagodili smo vprašalnik za merjenje različnih vidikov ustvarjalnosti, ki sta ga razvila Kumar & Hollman (1997). Rezultati niso pokazali statistično pomembnih razlik v ustvarjalnosti med študenti glede na spol in glede na to, ali so pedagoški ali nepedagoški študenti. Sklepamo lahko, da na izražanje ustvarjalnosti verjetno vplivajo številni drugi dejavniki.

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Uvod

The European Reference Framework for Key Competences for Lifelong Learning (ERF, 2006) was prepared and adopted in 2006. The framework identifies eight key competences and cross-cutting themes that combine knowledge, skills, and the right attitude. One of these is “Sense of initiative and entrepreneurship”, defined as the “ability to turn ideas into action through creativity, innovation and risk taking as well as ability to plan and manage projects”. In 2009, the EU agreed a new strategic programme for European cooperation in education and training, ET 2020 (ECET, 2009), which means that EU countries have set themselves the goal of developing creativity, innovation and, consequently, entrepreneurship in the education system. This excellent decision, however, does prompt some concerns. As Oliver et al. (2006) have pointed out, many students experience a conflict between being ‘creative’ and being ‘academic’. The emphasis on critical thinking develops convergent thinking, which focuses narrowly on a specific and verifiable objective. Adriansen (2010) discusses questions such as what creative thinking is and how it relates to critical thinking. Another concern is linked to the teachers who are responsible for developing creativity in young people. We ask ourselves the following questions: Are teachers qualified for this task? Are teachers more creative than other professionals?

Granted that student creativity is an important educational goal, the fostering of student creativity has become an added responsibility of teachers (Mulyono, 2018; Kaplan, 2019). The teacher is the one who is expected to promote or foster creativity among learners (Soh, 2017). Consequently, the teaching behaviour of educators plays a key role in encouraging the creativity of learners. Lee and Kemple (2014) confirm in their research that preservice teachers with higher scores on the openness to experience personality trait show more engagement in creativity-related experiences; those with higher scores on the openness trait and who have more creativity-related experiences are more likely to espouse creativity-fostering teaching styles.

These results are of immense importance, as it means that by developing the competence of creativity among preservice teachers, we can significantly improve creativity in schools.

We find that creativity in education should not be ignored. In this paper, we discuss one of the most important problems in education: the inclusion of creativity in education and encouragement of students to become more aware of the importance of creativity in the educational process. If we seek to focus on the field of creativity, we must first encourage students who are training for the teaching profession to think about creativity, so that they will later be able to encourage creative thinking in the classroom.

The aim of the study was to explore whether there were significant differences in creativity between pedagogical and non-pedagogical students. Additionally, differences in self-assessed creativity between genders were explored. The following hypotheses were set:

- *Hypothesis 1:* There is a statistically significant difference in self-assessment of creativity between the genders.
- *Hypothesis 2:* There is a statistically significant difference in self-assessment of creativity between pedagogical and non-pedagogical students.

Literature Review:

Definition and measurement of creativity

There are a range of definitions defining creativity from different perspectives. In the first half of the 20th century, creativity studies were linked to the study of talented individuals (Al-Ababneh, 2020). At that time, creativity was seen as a gift of nature. Later, pioneers Guilford (1950) and Torrance (1965, 1972) set the psychometrical theories and developed measurement instruments to measure creativity from a psychometric viewpoint (Sternberg, 2006). Such perceptions of creativity stimulated the interest of scholars in creativity, which led to the first more concrete descriptions and definitions of the creativity concept. As cited by Barbot et al. (2011), Treffinger (1995) wrote over 100 different definitions of creativity, which shows that a basic definition is very difficult to formulate.

Creativity, however, has another special feature. It can be measured in many conceptually different ways. Numerous methods for measuring creativity exist, depending on the concept, and we aim to explore these (Barbot et al., 2011; Guilford, 1950; Jaušovec, 1987, Torrance, 1965).

Guilford and his colleagues put together a number of tests to measure creativity, focused on divergent thinking. Torrance (1965, 1972) identified more than 200 different ways of measuring creativity that focused primarily on general creative thinking. At the same time, we must remain aware that there are many ways and techniques for evaluating creativity in specific areas of expression, e.g., music, painting, etc. (Barbot et al., 2011).

Depending on the set research goals, the authors use various standardised tests of creativity. Thus, some measure creativity with Torrance tests (Ozkanand Topsakal, 2019; Pilar Matud et al., 2007; Van Goch, 2018), others choose the questionnaire method (Hoffmann et al., 2016; Merckelbach et al., 2001; Šorgo et al., 2012), and some developed their own methods to measure creativity, like Runcoa et al. (2017), and Kumar et al. (1997), which were used in this research. The questionnaire method was chosen because the survey was carried out at the time of the pandemic, and it was the safest way to conduct the survey.

Theoretical background

Numerous studies have confirmed differences between the creativity of students of social sciences and students of natural sciences (Cheung et al., 2002; Hartley and Greggs, 1997; Zare, 2011). Research results show that students of social sciences (and those in the humanities) have better results on tests of divergent thinking than students of natural sciences. The reasons can therefore be found in the fact that students of social sciences are more susceptible to divergent thinking, while students of natural sciences are more operative with abstract information and known formulas, which makes their divergent thinking less central (Cheung et al., 2002). Similarly, one could infer the difference between students in pedagogical programs and those studying non-pedagogical programs. When reviewing previous research, we found none that compared the creativity of these groups of students.

By comparing several studies of gender differences in creativity, it is not possible to conclude which gender expresses greater creativity. Cheung et al. (2002) cites some research in their article that states males are more creative, while Matud et al. (2007) cites research in their article that shows females can be more creative. They offer several explanations for why gender differences occur. It is quite likely that there are other factors influencing the difference, such as the environment in the development of children and the environment in which the creation process takes place (Matud et al., 2007).

However, Baer and Kaufman (2008) refer to several studies showing that there is no gender difference in creativity. We can conclude that the differences are mainly due to other influences.

Methodology

For the purposes of the study, an adapted and revised Kumar and Hollman (1997) questionnaire was used to measure various aspects of creativity. With it, we were able to measure how much belief in the field of creativity individuals express and what their creativity strategies are. The results of the questionnaire made it possible to investigate any differences in self-assessment of creativity between genders and different study programs.

Sample and sampling

The study was carried out in the summer semester of the 2019/2020 school year - from April to July. An online questionnaire was created by the open-source application for web surveys 1Ka. The link was managed via the university's e-mailing list and offered to the entire population of students ($n = 1183$) at the Faculty of Natural Sciences and Mathematics, the Faculty of Education, and the Faculty of Arts (all units of the University of Maribor). The instrument was anonymous, and response was considered as consent. The introductory text/invitation to take the survey was read by 230 students. Seventy-five students began the survey, one of whom did not complete it. Thus, a total of seventy-four relevant responses were received, of which 57 (77%) of them were by females. The ratio between respondents studying the pedagogical program and those studying the non-pedagogical program was 50:50.

The study included students at all three study levels: undergraduate students, master's and doctoral students. The students come from various regions in Slovenia and from areas with differing status. Thus, varied student profiles were covered in the survey.

Description of the instrument

We adapted Kumar and Hollman's (1997) revised questionnaire for measuring various aspects of creativity. The original questionnaire contains seventy-eight claims, divided into eight different sections. We chose only the first three sets for our research. The questionnaire is in the Appendix.

The first set contains two questions and measures the extent to which an individual perceives himself to be creative.

The second set, which measures the extent to which an individual believes in the creative process, as something over which he or she has little control, consists of seventeen statements.

The third set, however, contains eighteen statements that measure the extent to which an individual uses specific strategies or techniques to facilitate creative work. Respondents express their agreement with the stated claims on a 5-point scale with choices from 1 to 5: 1 - Strongly Agree, 2 - Agree, 3 - Unsure, 4 - Disagree and 5 - Strongly Disagree. Care must be exercised in the analysis, since some issues are reversed, which in the analysis of the results must be taken into consideration to avoid errors. Based on the answers, we can determine what the individuals' self-assessment shows about their creativity.

Analyses

After all the data had been collected, it was first considered that some data needed to be reversed. If this was not done, then the results would not be correct, and the data analysis performed would be incorrect.

The results were calculated following the scoring key, which forms part of the questionnaire (Kumar and Hollman's, 1997). The data for each respondent were summarised according to individual sets. In the first set, it was sufficient for both types of questions to be added up, while in the second and third sets, the results of each respondent within the set had to be added up and divided by the number of statements in the set. Thus, the sum of the answers in the second set was divided by seventeen, because seventeen statements were given in the second set, and the third set was divided by eighteen. The results were rounded to two decimal places.

The data was processed with SPSS statistical software. Descriptive statistics were calculated: frequencies, mean values, and standard deviation. An independent t-test with a 95% confidence interval was also calculated to compare the results between genders, and between students of pedagogical and non-pedagogical study programs.

Results

Prior to performing the t-test, we performed an analysis to determine the normality of the distributions for individual sets. The analysis showed that all distributions were normal.

An independent t-test was performed in the SPSS program to verify Hypothesis 1. The results of the questions in all three sets were compared according to gender.

First, a comparison of the results between males and females in set 1 (which measures the extent of self-perceived creativity) can be observed. This is followed by a comparison for set 2, which measures the extent to which an individual believes in the creative process, as one over which he or she has little control, and finally a comparison by gender in the third set, which measures the extent to which an individual uses specific strategies or techniques to facilitate creative work.

Table 1: T-test of showing creativity by sets according to gender.

		<i>n</i>	<i>M</i>	<i>SD</i>	<i>t</i>	<i>p</i>	<i>df</i>	95% Confidence Interval of the Difference		Cohen's <i>d</i>
								Lower	Upper	
Set1	female	57	7.16	1.62	.34	.73	72	-.76	1.08	.09
	male	17	7.00	1.80						
Set2	female	57	2.77	.41	-.59	.56	72	-.30	.16	.17
	male	17	2.84	.41						
Set3	female	57	2.99	.45	1.00	.32	72	-.13	.40	.25
	male	17	2.86	.58						

According to Cohen (2008), we find a 'small' effect size $d_{Cohen} < .2$ for the first and the second set and a moderate small $d_{Cohen} = .25$ for the third set. This means that the difference between genders is trivial. In practice, this means that the gender effect size on the individual's perception of creativity, on respondents' beliefs in the creative process, and on the choice of strategies for achieving creativity, is small.

We thus established that the difference in self-assessment of creativity between genders is statistically insignificant. A more detailed explanation of the results and discussion follows in the next section.

To test Hypothesis 2, an independent t-test was calculated. Table 2 shows the results of the analysis of the creativity comparison according to pedagogical or non-pedagogical field of study.

Table 2: t-test of showing creativity in sets according to pedagogical or non-pedagogical study program

		<i>n</i>	<i>M</i>	<i>SD</i>	<i>t</i>	<i>p</i>	<i>df</i>	95% Confidence Interval of the Difference		Cohen's <i>d</i>
								Lower	Upper	
Set1	pedagogical	37	6.97	1.55	-.77	.44	72	-1.07	.47	.18
	non-pedagogical	37	7.27	1.76						
Set2	pedagogical	37	2.82	.46	.68	.50	72	-.13	.26	.17
	non-pedagogical	37	2.75	.36						
Set3	pedagogical	37	2.99	.48	.39	.70	72	-.18	.27	.10
	non-pedagogical	37	2.94	.50						

A small difference in means between groups is confirmed by Cohen's effect size (*d*), which is calculated below .2 for all sets. This means that the difference in self-assessed creativity between pedagogical and non-pedagogical students is negligible. We established that the difference in self-assessment of creativity between pedagogical and non-pedagogical students was statistically insignificant. A more detailed explanation of the results and discussion follow in the next section.

Discussion

The discussion is organized as comments and verification of the hypotheses that were set for the study.

H1: There is a statistically significant difference in self-assessment of creativity between the genders.

The results in Table 1 show that females scored slightly higher mean values in set 1 and set 3, which means that they assessed themselves as slightly more creative and as using special strategies or techniques to facilitate creative work more often, while males scored slightly higher mean values in set 2, which means that they are slightly more confident in the creative process; however, the differences are statistically insignificant. The first hypothesis is thus rejected.

After a comparison of studies on differences in creativity between the genders, as established in the theoretical section, we found that other researchers had difficulty singling out one gender and claiming that it expresses greater creativity than the other. Our study has confirmed that there is no statistically significant difference between the genders. Our results are in line with those by Baer and Kaufman (2008), which reported no gender difference in creativity.

Clearly, the expression of creativity is likely to be influenced by many other factors - for example lifestyle, educational status, social status, etc.

H2: There is a statistically significant difference in self-assessment of creativity between pedagogical and non-pedagogical students.

The results in Table 2 show that respondents from pedagogical programs, reached slightly higher mean values in set 2 and set 3, which means that they self-reported as slightly more confident in the creative process and as using special strategies or techniques to facilitate creative work more often; in contrast, respondents from non-pedagogical programs reached slightly higher mean values in set 1, which means that they were slightly more creative. These differences, however, are statistically insignificant. We found no statistically significant difference between pedagogical and non-pedagogical students. This means that both groups have the same perception of being creative, that they believe equally in the creative process, and that they are equally likely to use specific strategies or techniques to facilitate creative work. The second hypothesis is thus rejected.

We were unable to find any studies comparing the creativity of pedagogical and non-pedagogical students; therefore, we can only speculate that no significant differences were detected between the groups because of the small sample size in the study, which is considered a limitation of the study. A further limitation could be the implementation of the study programs at the University of Maribor: pedagogical and non-pedagogical students attend the same lectures, to a certain extent. Only specific parts of the programs or content are implemented separately. The results could also be influenced by the lack of an obligatory course on creativity for students in the pedagogical program. Only those who choose elective courses can learn about creativity.

We suggest that the study be repeated on a larger sample of respondents.

Conclusion

This study examined the creativity of students from three faculties at the University of Maribor was. Faculties that offer both pedagogical and non-pedagogical programs were chosen for the study. The results showed no statistically significant differences in creativity between students according to gender, or according to whether they were pedagogical or non-pedagogical students.

It can be concluded that the expression of creativity is likely to be influenced by many other factors - for example lifestyle, educational status, social status, etc. There is much potential for upgrading this research: increasing the sample size, comparing more diverse groups, for example students at different study levels, students taking the elective course Creativity, or exploring differences in creativity according to student success in their programs.

We believe that the invitation to participate in the research has already encouraged students to think about creativity. The students who participated in the research were confronted with claims about the creative process, and during the research itself, they also had to consider their own attitude towards creativity to be able to answer all the questions. The authors believe that our research will encourage readers to think similarly and stakeholders to include a creativity course as an obligatory part of pedagogical study programmes. We also believe that similar research can encourage teachers to pay more attention to creativity in their work.

During the research, we did identify one limitation to our study: small sample size. We believe that in future we should conduct a similar survey on a larger sample of students.

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