ISSN: 2345-0479 / eISSN: 2345-0487

VILNIUS TECH
Vilnius Gediminas Technical University

CREATIVITY STUDIES

2025
Volume 18
Issue 2
Pages 620–634

https://doi.org/10.3846/cs.2025.18515

UNIVERSITY STUDENTS' PERSPECTIVES ON CREATIVITY IN LEARNING IN THE 21ST CENTURY

Jonni SITORUS[1, 2] ✉

[1]*Department of Basic Education, Faculty of Teacher Training and Education, University of Bina Bangsa Getsempena, Jl. Tanggul Krueng Lamnyong, no. 34 Rukoh, Kec. Syiah Kuala Kota, 23112 Banda Aceh, Indonesia*
[2]*Regional Development Planning Agency of North Sumatra Province, Jl. Pangeran Diponegoro no 21A, Madras Hulu, Kec. Medan Polonia, Kota Medan, Sumatera Utara, 20152 Medan, Indonesia*

Article History:
- received 22 January 2023
- accepted 24 October 2023

Abstract. The importance of students' creativity in tertiary institutions lies in the need to prepare young people for the 21st century. On the other hand, higher education is generally unfamiliar with creativity environments, so it will hinder their learning creativity outcomes and experiences, which will impact their creativity cognition and knowledge. The research goals are to calculate the percentages of university students' perspectives on the importance of their learning creativity outcomes and experiences and to test the influence of each variable. All respondents are 586, with an age range of 19–24 years. The author created learning creativity instruments. The results showed that there are twelve outcomes and eleven experiences of learning creativity that are important to university students. Less than 50% of university students get learning creativity experiences on campus four or more times a week and/or for more than three hours a day. There is a positive and significant influence between the importance of learning creativity outcomes and experiences as well as the frequency and duration of those experiences. For achieving twelve learning creativity outcomes, tertiary institutions must ensure the implementation of experiences learning creativity experiences, as well as the adequacy of the frequency and duration of those experiences.

Keywords: 21st century, creativity in learning, experiences, outcomes, perspectives, university students.

✉Corresponding author. E-mail: ***sitorus_jonni@yahoo.co.id***

1. Introduction

Creativity can be understood as a multidimensional construct involving cognition, characteristics, education, social interaction, and culture (de Cassia Nakano & Wechsler, 2018). Its products include tangible and intangible objects (*e.g.*, ideas, processes, services, *etc.*) (Cropley, 2020).

Creativity is important for life achievement and better change (Forster, 2014–2015). Creativity helps individuals take better advantage of opportunities and respond more productively to challenges and adversity in their personal and professional lives (Soriano de Alencar et al., 2017). The utilization of creative capacity and efforts to develop creativity are needed to find solutions to the complex problems of the 21st century (Robinson, 2011; Florida, 2006; Egan et al., 2017). Technological advancements have resulted in changes in how people work (L. D. Newton & D. P. Newton, 2014).

The education system is often accused of killing creativity and being the reason for students' failure (Gonçalves & Lima Rua, 2021; Hee Kim & VanTassel-Baska, 2010). Creativity still finds it difficult to penetrate the rigid and highly structured curriculum and syllabus, so

students do not seem to have enough time for creative activities (Gormley, 2020; Mangion & Riebel, 2023). This will hinder the achievement of their learning creativity outcomes and experiences on campus, which will impact their creativity cognition, and knowledge. The curriculum should be able to accommodate learning creativity by integrating it into each lesson subject in each faculty on campus.

The importance of students' creativity in tertiary institutions lies in the need to prepare young people to face an uncertain and complex world of work, which requires individuals to be able to use their creative abilities (Soriano de Alencar et al., 2017). The encouragement of creativity in higher education has been a challenge for faculty, who are generally unfamiliar with learning and teaching environments that encourage creativity.

2. Creativity in learning

Creativity is built from four components: 1) person, 2) product, 3) process, and 4) press (Daly et al., 2016). Creative people focus on the characteristics of people, for example, tending to be open to new experiences, more confident, self-accepting, ambitious, dominant, hostile, self-concept, intelligence, temperament, and impulsive (Feist, 2004). Product refers to physical objects, ideas, services, or results, which can be tangible or intangible (Cropley, 2020). The term *process* refers to what happens in people's minds while they are being creative and then transforming their ideas into physical entities/activities, such as motivation, perception, learning, thinking, realizing ideas, and/or communication. The press is the environment in which creativity takes place, such as classroom, workplace, culture, friendships, *etc.* (Runco & Pagnani, 2011).

According to Schachtel (2001), creativity is a metamorphosis of perceptual and conceptual experiences. The metamorphosis of experience that results in creative behavior or action depends on the opportunity (time) and intensity (how often) of individual experiences, which have cognitive, intuitive, affective, and sensory dimensions related to their environment. This state is possible only when there is openness to the perceived environment or object.

Creativity is a skill that can be applied to learning in every school subject (Cachia & Ferrari, 2010). Creativity and learning are connected (Oakley, 2014). The brain works when trying to learn a new concept or thing. It is possible to achieve a better awareness of how to learn when facing problems that will require creativity.

Creativity in learning helps students solve problems, negotiate with others, and see the world from various perspectives (Daly et al., 2016). Students need to convey their ideas, persuade others to be creative, and think creatively when solving real-world problems through authentic learning experiences that will connect them to the world outside the school gates.

Learning outcomes are behaviors that are obtained by students after experiencing learning activities (Nur Setyaningsih et al., 2022), which include cognitive, affective, and psychomotor (Sudjana, 2011). It means that learning outcomes and experiences mutually influence each other. The creativity experiences can be defined as the creative activities on meaningful actions and interactions that are characterized by the principles of openness, nonlinearity, multiple perspectives, and future orientation (Glăveanu, 2018).

The learning creativity outcomes that are important for students: thinking critically, problem-solving skills, students' curiosity to learn beyond the classroom, collaborating with others, self-discipline, meaningful learning experiences, self-confidence, preparing for the workplace, learning 21st century technology skills, preparing for college, participating in extracurricular activities, and good grades (GALLUP, 2019). Learning creativity experiences that are often carried out at schools, based on the percentage of students' choice: practicing subjects (49%); coming up with their own ideas (44%); preparing for a test or quiz (43%); discussing more open-ended questions (36%); doing something in different ways (36%); doing something in different subjects (35%); working in the real world (26%); demonstrating something in creative ways (23%); sharing activities with the others outside of the classroom (16%); and choosing what to learn in class (11%) (GALLUP, 2019). This previous research is based on the viewpoints of parents, teachers, and primary school students, whose subject matter is different from what was done in this research, namely from the university students' perspectives themselves. A statistical test (linear regression analysis) was also carried out among variables, which *Gallup, Inc.* (GALLUP, 2019) had not done in his/her research, thus adding to the uniqueness and novelty of this research.

Time is an important resource for creativity (Zampetakis et al., 2010). Individuals must be given sufficient time for incubation if they are expected to do creative work (Runco, 2007; Yunus, 2015). Lack of time and excessive workload are factors that hinder and limit students' creativity in tertiary institutions (Bezerra Figueiredo Lima & Soriano de Alencar, 2014; Zampetakis et al., 2010; Schreuder & Mioch, 2011). Students' learning creativity experiences who spend enough time at school, based on the percentage of students' choice: working on worksheets (87%); working with other students (77%); practicing subjects (76%); preparing for a test or quiz (74%); doing something in new ways (56%); demonstrating something in creative ways (56%); sharing activities with the others outside of the classroom (48%); working in the real world (39%); and choosing what to learn in class (27%) (GALLUP, 2019). This research does not only calculate the viewpoint percentages as had been done in previous research, but also calculates the percentage of reality in the field related to how often students get learning creativity experiences on campus, both in frequency and time duration, which can also be referred to as this research's novelty value.

Burkšaitienė (2018) stated that choosing free topics for writing tasks and implementing ideas into realities impact students' creativity. Creativity can be fostered by self-confidence and courage, teamwork, pair-work, and collaboration. Participating in extracurricular activities by contributing to special events (*e.g.*, exhibitions of paintings, music contests) is important and can develop creativity. Yusuf and Jazilah (2020) stated that the competencies needed to explore their creativity in learning: self-confidence, conveying ideas based on the given topic, organizing ideas based on the given topic, discussing with friends, and discussing the problem with the teacher. This research tried to develop what has been researched in two previous ones related to learning creativity outcomes and experiences with more indicators or competencies of learning creativity to trace.

This research also traces the influence between the importance of university students learning creativity outcomes and other variables based on university students' perspectives. The learner's perspective is reflected in their self-reported learning quality and quantity

(Yurdugül & Menzi Çetin, 2015). According to some authors (Fritzsche, 1977), learners' perspectives on learning shape their challenge and attitude towards learning content. Paechter et al. (2010) stated that students' perspectives on the importance of learning outcomes are affected by their achievement goals because they make more effort to experience learning.

2.1. Research questions

Research questions are as follows:

Q1: What are the learning creativity outcomes that are important for university students?

Q2: What are the learning creativity experiences that are important for university students?

Q3: How often do university students get the learning creativity experiences on campus in a week?

Q4: How much time do university students spend in a day on campus engaging in creative learning experiences?

Q5: Does the importance of university students learning creativity outcomes have a positive and significant influence with: the importance of their learning creativity experiences based on their perspectives, the frequency of times university students get learning creativity experiences on campus in a week, and the duration of times university students spend on campus engaging in learning creativity experiences in a day?

The research goals are to calculate the percentages of university students' perspectives on the importance of their learning creativity outcomes and experiences, as well as the adequacy of the frequency and duration of those experiences, and to test the influence of each variable.

2.2. Hypothesis

The importance of university students learning creativity outcomes has a positive and significant influence with: the importance of their learning creativity experiences, based on their perspectives, the frequency of times university students get learning creativity experiences on campus in a week, and the duration of times university students spend on campus engaging in learning creativity experiences in a day.

3. Method

3.1. Population and sample

The population is all university students who take undergraduate programs in every grade and hold a primary teacher education (basic education) major at three universities in Indonesia. This major is a field of knowledge that provides provisions on how to become an educator as well as a teacher for primary students. Subjects studied by each student in this major as an Indonesian curriculum version are: Educational Psychology, General and Developmental Psychology, Art Development for Children, Learning Theory, Educational Philosophy, Basic Education Management, Guidance in Elementary Schools, Indonesian Language, Social Sciences Basic Concepts, Internship Basic Concepts, Science Basic Concepts, Basic Natural Sciences, Literary Appreciation, and Fine Arts Education. This means that all students in this

major have same educational characteristics, so they can be categorized as having the same creativity in learning perspectives.

The researcher employed the Hosmer–Lemeshow test (n – unknown population) to determine the number of samples (Hosmer, Lemeshow 2000):

$$n = \frac{Z^2_{\alpha\, p\, q}}{d^2} = \frac{Z^2\, p(1-p)}{d^2},$$

Notes: p – proportion of subjects from previous studies. If not found by previous researchers, use of 0.50; *q* = 1 – p = 1 – 0.50 = 0.50; *d* – the level of precision. For *p* between 10% and 90%, using *d* = 0.05; *Z* = 95% confidence level = 1.96 (default); n – the total number of samples.

So, n = $(1.96)^2$ x 0.5 x 0.5: $(0.05)^2$ = 384.2 ≈ at least 400 respondents. The sample size at each university is distributed equally, with at least 134 respondents. The total sample size is 586 respondents, with 52% women and 48% men, ranging in age from 19 to 24 years. They are 87 19-year-olds (14.85%); 112 20-year-olds (19.11%); 158 21-year-olds (26.96%); 99 22-year-olds (16.89%); 77 23-year-olds (13.14%); and 53 24-year-olds (9.04%). The samples are chosen randomly from the population.

3.2. Data collection and analysis

The researcher created a set of instruments in the form of a questionnaire (4 questions). The questionnaire was designed by adopting, adapting, developing, and/or interpreting theories of creativity in learning and relevant research results, as explained above. The twelve learning creativity outcomes are: 1) self-discipline, 2) self-confidence, 3) problem-solving skills, 4) meaningful learning experiences, 5) 21st century technology skills, 6) real-world learning experiences, 7) good grades, 8) critical thinking, 9) a desire to learn outside the classroom, 10) collaboration with others, 11) preparing for the workplace, and 12) participating in extracurricular activities. The eleven learning creativity experiences are: 1) training myself to solve the subject matter, 2) making my own decisions, 3) choosing what to learn in class, 4) preparing for tests or quizzes, 5) coming up with my own ideas regarding how to solve problems, 6) doing something in different ways, 7) doing something on different subjects, 8) discussing more open-ended questions, 9) demonstrating something in creative ways, 10) working in the real world, and 11) involving people outside of the classroom to share projects.

The questionnaire is…

1) …a question regarding how important twelve learning creativity outcomes and eleven learning creativity experiences for university students, based on their perspectives. The answer choices for both questions are the same, namely, by using a scale of 5: 1 (not important), 2 (less important), 3 (quite important), 4 (important), and 5 (very important);

2) …a question regarding how often university students get the eleven learning creativity experiences on campus in a week, based on university students' perspectives. The answer choices are based on a scale of 5: 1 (never), 2 (rarely, 1–2 times), 3 (sometimes, 3 times), 4 (often, 4 times), or 5 (very often, more than 5 times);

and 3) …a question regarding how much time the university students spend in a day on campus engaging in learning creativity experiences, based on the university students' perspectives. The answer choices are on a scale of 5: 1 (very little, less than 1 hour), 2 (a little,

more than 1–2 hours), 3 (enough, more than 2–3 hours), 4 (much, more than 3–4 hours), or 5 (very much, more than 4 hours).

Validation and reliability tests were also carried out for the questionnaire. A Pearson product-moment correlation with α = 5% and N = 586 was used for validation. The reliability test used Cronbach's alpha with N = 586 (the number of respondents) and n1 = 12 and n2 = 11 (n1 and n2 – the number of questions). The results of the validation test are valid for each $r\text{-}_{xy} > r\text{-}_{table}$ (0.077). The reliability test results are 0.891 and 0.782 for both learning creativity experiences and outcomes, respectively, which are very high, and each $r\text{-}_{xy}$ is greater than $r\text{-}_{table}$ (0.077), so results are reliable.

The researchers used frequency/proportion analysis and mode analysis of the Likert scale (Likert, 1932). The frequency analysis is used to calculate the number of respondents who answer each question based on each of the five scales, then the results are converted into percentages (of university students), and they are analyzed descriptively. The mode analysis is used to describe the largest number of respondents who answer each question based on each of the five scales, and they are analyzed descriptively. For example, for the learning creativity outcome of number 1 (critical thinking), the number of university students who choose the answer "not important" is 2 respondents, or 0.34% of 586 respondents; those who choose the answer "less important" are 1 respondent, or 0.24% of 586 respondents; and so on. The same calculation is done for other items. After that, the researcher sorted all items from the highest to the lowest university students' choice percentage.

A statistical test was carried out using a linear regression analysis to see the influence between the importance of university students learning creativity outcomes and other variables. The confidence level was 95%, with a significance level of 5% (α = 0.05). If the *p*-value is greater than 0.05, then there is no significant positive influence between each of the independent and dependent variables. If the *p*-value is less than 0.05, then there is a positive and significant influence between each of the independent and dependent variables.

4. Results

4.1. University students' perspectives on how important learning creativity outcomes to them

Based on Table 1, the learning creativity outcomes that are important to university students, based on the percentage (important and very important) of their perspectives, from the highest to the lowest, and the percentages of the most answer choices, respectively: problem-solving skills (67.79%; 39.28% (important)); critical thinking (67.43%; 44.29% (important)); self-confidence (67.26%; 39.17% (important)); self-discipline (63.89%; 39.67% (important)); real-world learning experiences (58.05%; 41.16% (quite important)); meaningful learning experiences (57.70%; 41.79% (quite important)); good grades (54.34%; 44.62% (quite important)); collaboration with others (51.15%; 48.03% (quite important)); desire to learn outside the classroom (49.38%; 49.93% (quite important)); participating in extra-curricular activities (47.43%; 50.53% (quite important)); preparing for the workplace (45.31%; 51.35% (quite important)); and 21st century technology skills (43.19%; 53.21% (quite important)).

Table 1. University students' percentage who say how important the learning creativity outcomes to them (source: created by the author)

No.	Learning creativity outcomes	University students' percentage, %				
		Not important	Less important	Quite important	Important	Very important
1.	Critical thinking	0.34	0.24	31.99	44.29	23.14
2.	Problem-solving skills	0.25	0.48	31.48	39.28	28.51
3.	Desire to learn outside the classroom	0.36	0.33	49.93	23.53	25.85
4.	Collaboration with others	0.24	0.58	48.03	22.04	29.11
5.	Self-discipline	0.66	0.45	35.00	39.67	24.22
6.	Meaningful learning experiences	0.22	0.29	41.79	22.28	35.42
7.	Self-confidence	0.00	0.66	32.08	39.17	28.09
8.	Preparing for the workplace	0.44	2.90	51.35	19.14	26.17
9.	21st century technology skills	0.52	3.08	53.21	19.08	24.11
10.	Real-world learning experiences	0.42	0.37	41.16	22.88	35.17
11.	Participating in extra-curricular activities	0.00	2.04	50.53	10.19	37.24
12.	Good grades	0.25	0.79	44.62	15.08	39.26
13.	Others	0.00	0.00	15.40	0.00	0.00

Based on the instrument, 38.57% of university students stated all twelve learning creativity outcomes are important to them. Other learning creativity outcomes that are important for them are skills for imagination, entrepreneur, debating, motivation, and negotiating.

4.2. University students' perspectives on how important learning creativity experiences to them

Based on Table 2, the learning creativity experiences that are important for university students, based on the percentage (important and very important) of their perspectives, from the highest to the lowest, and the percentages of the most answer choices, respectively: training myself to solve the subject matter (85.92%; 52.64% (important)); preparing for tests or quizzes (84.11%; 45.65% (important)); demonstrating something in creative ways (84.08%; 51.90% (important)); choosing what to learn in class (82.53%; 52.25% (important)); coming up with my own ideas (82.43%; 51.91% (important)); working in the real world (82.26%; 47.11% (important)); doing something in different subjects (82.13%; 54.98% (important)); making my own decisions (81.98%; 53.73% (important)); doing something in different ways (81.87%; 53.02% (important)); involving people outside of the classroom to share projects (75.15%; 48.04% (important)); and discussing more open-ended problems (74.82%; 49.65% (important)).

Based on the instrument, 48.12% stated all eleven learning creativity experiences are important to them. Other learning creativity experiences that are important to them: identifying problems, thinking creatively, thinking differently, posing problems, and debating.

Table 2. University students' percentage who say how important the learning creativity experiences to them (source: created by the author)

No.	Learning creativity experiences	University students' percentage, %				
		Not important	Less important	Quite important	Important	Very important
1.	Working in the real world	0.34	0.34	17.06	47.11	35.15
2.	Coming up with my own ideas regarding how to solve problems	0.45	0.45	16.67	51.91	30.52
3.	Doing something in different ways	0.17	0.52	17.44	53.02	28.85
4.	Doing something on different subjects	0.34	0.52	17.01	54.98	27.15
5.	Making my own decisions	0.86	0.35	16.81	53.73	28.25
6.	Training myself to solve the subject matter	0.11	0.35	13.62	52.64	33.28
7.	Discussing more open-ended problems	0.35	3.30	21.53	49.65	25.17
8.	Involving people outside of classroom to share projects	1.40	2.02	21.43	48.04	27.11
9.	Demonstrating something in creative ways	0.35	0.35	15.22	51.90	32.18
10.	Choosing what to learn in class	0.00	1.04	16.43	52.25	30.28
11.	Preparing for tests or quizzes	0.00	0.68	15.21	45.65	38.46
12.	Others	0.00	0.00	6.75	11.67	0.00

4.3. University students' perspectives on how often they get learning creativity experiences on campus in a week

Based on Table 3, the learning creativity experiences that university students often (4 or more times in a week) get on campus, based on the percentage (often and very often) of their perspectives, from the highest to the lowest, and the percentages of the most answer choices, respectively: making my own decisions (69.74%; 59.14% (often)); preparing for tests or quizzes (69.50%; 59.45% (often)); working in the real world (68.50%; 56.27% (often)); doing something in different ways (67.00%; 58.50% (often)); training myself to solve the subject matter (65.99%; 56.99% (often)); coming up with my own ideas (65.66%; 58.58% (often)); demonstrating something in creative ways (65.29%; 55.27% (often)); doing something in different subjects (64.35%; 56.52% (often)); choosing what to learn in class (63.02%; 53.60% (often)); involving people outside of the classroom to share projects (58.01%; 51.03% (often)); and discussing more open-ended problems (57.70%; 50.42% (often)).

Based on the instrument, 45.56% of university students stated that they often get all eleven learning creativity experiences on campus in a week.

Table 3. University students' percentage who say how often they get learning creativity experiences on campus in a week (source: created by the author)

No.	Learning creativity experiences	University students' percentage, %				
		Never	Rarely	Sometimes	Often	Very often
1.	Working in the real world	1.01	8.21	22.28	56.27	12.23
2.	Coming up with my own ideas regarding how to solve problems	1.06	5.84	27.44	58.58	7.08
3.	Doing something in different ways	0.86	5.78	26.36	58.50	8.50
4.	Doing something in different subjects	0.35	6.43	28.87	56.52	7.83
5.	Making my own decisions	0.85	6.50	22.91	59.14	10.60
6.	Training myself to solve the subject matter	0.52	5.67	27.82	56.99	9.00
7.	Discussing more open-ended problems	1.86	9.81	30.63	50.42	7.28
8.	Involving people outside of classroom to share projects	2.87	13.11	26.01	51.03	6.98
9.	Demonstrating somethings in creative ways	0.69	7.42	26.60	55.27	10.02
10.	Choosing what to learn in class	2.05	5.14	29.79	53.60	9.42
11.	Preparing for tests or quizzes	0.52	4.60	25.38	59.45	10.05
12.	Others	0.00	0.00	12.01	0.00	1.21

4.4. University students' perspectives on how much time they spend in a day on campus engaging in learning creativity experiences

Based on Table 4, the learning creativity experiences that university students spend much time (more than 3 hours in a day) engaging in on campus, based on the percentage (a lot and very much) of their perspectives, from the highest to the lowest, and the percentages of the most answer choices, respectively: preparing for tests or quizzes (60.82%; 47.70% (a lot)); training myself to solve the subject matter (58.27%; 42.49% (a lot)); demonstrating something in creative ways (55.92%; 45.63% (a lot)); choosing what to learn in class (55.50%; 47.25% (a lot)); working in the real world (55.25%; 46.10% (a lot)); doing something in different ways (54.61%; 46.08% (a lot)); doing something in different subjects (53.02%; 44.59% (a lot)); coming up with my own ideas (53.00%; 43.93% (a lot)); making my own decisions (52.83%; 44.25% (a lot)); involving people outside of the classroom to share projects (50.78%; 42.04% (a lot)); and discussing more open-ended problems (49.58%; 43.44% (enough)).

Based on the instrument, 37.71% of university students stated that they spend a lot of time engaging in all eleven learning creativity experiences on campus.

Table 4. University students' percentage who say how much time they spend in a day on campus engaging in learning creativity experiences (source: created by the author)

No.	Learning creativity experiences	University students' percentage, %				
		Very little	A little	Enough	A lot	Very much
1.	Working in the real world	1.19	5.93	37.63	46.10	9.15
2.	Coming up with my own ideas regarding how to solve problems	0.51	5.98	40.51	43.93	9.07
3.	Doing something in different ways	1.02	4.61	39.76	46.08	8.53
4.	Doing something in different subjects	1.20	5.68	40.10	44.59	8.43
5.	Making my own decisions	1.20	5.66	40.31	44.25	8.58
6.	Training myself to solve the subject matter	2.04	10.02	29.67	42.49	15.78
7.	Discussing more open-ended problems	1.36	5.62	43.44	40.21	9.37
8.	Involving people outside of classroom to share projects	2.70	8.01	38.51	42.04	8.74
9.	Demonstrating somethings in creative ways	2.06	4.97	37.05	45.63	10.29
10.	Choosing what to learn in class	1.37	6.19	36.94	47.25	8.25
11.	Preparing for tests or quizzes	0.85	3.41	34.92	47.70	13.12
12.	Others	0.00	0.26	8.01	0.00	0.00

4.5. The influence between the importance of university students learning creativity outcomes and other variables

Based on Table 5, the importance of university students learning creativity outcomes based on their perspectives has a positive and significant influence on: the importance of their learning creativity experiences, the time frequency they get learning creativity experiences on campus in a week, and the time duration they spend on campus engaging in learning creativity experiences in a day, with each having an exact significance value (2-tail) (p) of 0.000, which is less than 0.05, or the t-table value (1.964) is less than each of the Student's t-test value (respectively: 46.719, 34.478, 47.338). The linear regressions are, respectively: $Y_1' = 1.192 + 0.768X$, $Y_2' = 0.723 + 0.769X$, and $Y_3' = 0.269 + 0.865X$. The three constant values are positive, which means that there is a unidirectional influence between the independent and dependent variables. The values of coefficient of determination are, respectively, 0.7892, 0.6709 and 0.7935, with each contribution being 78.92%, 67.09%, and 79.35%.

Table 5. The influence between the importance of university students learning creativity outcomes and other variables (source: created by the author)

		Coefficient	Standard error	*t*-statistic	*p*-value	Coefficient of determination	Adjusted coefficient of determination	Observation
1.	Intercept	1.192	0.064	18.641	0.000	0.7892	0.7889	585
	X	0.768	0.016	46.719	0.000			
2.	Intercept	0.723	0.087	8.332	0.000	0.6709	0.6704	585
	X	0.769	0.022	34.478	0.000			
3.	Intercept	0.269	0.071	3.783	0.000	0.793	0.793	585
	X	0.865	0.019	47.338	0.000			

Notes:
1. The influence between the importance of university students learning creativity outcomes and the importance of their learning creativity experiences;
2. The influence between the importance of university students learning creativity outcomes and the time frequency they get learning creativity experiences on campus in a week;
3. The influence between the importance of university students learning creativity outcomes and the time duration they spend on campus engaging in learning creativity experiences in a day.

5. Discussion

Collaboration with others, critical thinking, making my own decisions, and problem-solving skills are important to university students in the 21st century. These findings are in line with some opinions, that the top skills sought in the 21st century are decision-making, creativity, collaboration skills, critical thinking, and problem-solving skills that cannot be programmed through technological sophistication (Kettler et al., 2021; Saleh, 2019). Although creativity is not always involved in all problem-solving, it may be necessary in the case of intractable problems (Cropley, 2020). Creativity always involves a product that solves a problem. Critical thinking allows people to organize their creative ideas to produce an end product.

Some learning creativity outcomes in the form of character that are important for university students in the 21st century are a desire to learn outside the classroom, self-discipline, self-confidence, a desire to participate in extracurricular activities, making own decisions, and a desire to get good grades. These findings are in line with the opinion of some authors (Bialik et al., 2015), who state that character is part of education dimensions in the 21st century, which consist of mindfulness, curiosity, courage, resilience, ethics, and leadership. The desire to learn outside the classroom, participate in extracurricular activities, and get good grades are all parts of the curiosity character trait. Self-confidence is part of the courage character trait. Self-discipline is part of resilience (Martinez & Tuesca, 2019).

Meaningful learning experiences, preparing for the workplace, and real-world learning experiences are important to university students. These findings are in line with the opinion of *Gallup*, *Inc.* (GALLUP, 2019), who found three of the twelve learning creativity outcomes she/he researched that are important for students at school, although seen from students' parent perspectives. Some authors (Gong et al., 2021) state that real-world learning experiences that address real-life issues through creativity can allow students to see something from different perspectives.

Coming up with ideas regarding how to solve problems is important for students. This finding is in line with the opinion of some researchers (Bledow et al., 2009), that the practice of new and useful ideas can benefit individuals, teams, organizations, or the wider society. This is not only a matter of how to generate new ideas but also how these ideas develop valuable products as an innovation form.

Doing or demonstrating something in creative ways for different subjects is also important for students. It means that students do something creative from various perspectives. This finding is in line with the opinions of Glăveanu (2011) and Gonçalves and Lima Rua (2021), who state that solving problems with the elusive creativity criteria depends on the integration of several perspectives, including its objective and subjective components.

Discussing more open-ended problems and involving people outside of the classroom to share projects are important for students. The core of both experiences is to involve other individuals in creative learning. These findings are in line with the opinion of Gonçalves and Lima Rua (2021) that students are involved in active discussions among themselves and with teachers.

Training oneself to solve the subject matter, preparing for tests or quizzes, and choosing what to learn in class are also important for students. They are three out of twelve experiences of creativity in learning that are important for students (GALLUP, 2019). Self-training is a technique for building personal creativity by giving oneself a chance to be creative, providing a fresh input of our thoughts, and providing a logbook to monitor our thoughts and ideas that emerge (Winardi, 2005). Then, the importance of preparing tests or quizzes in tertiary institutions is to determine students' creativity levels/scores in every subject being taught. Creativity can develop students' performance by providing new ways of thinking and problem-solving to reach solutions (J. K. Smith & L. F. Smith, 2010; Kaplan, 2019). Creativity is effective in achieving desired results in new ways (Cropley et al., 2011). Creativity is one of the factors that influence academic achievement, and there is a positive and statistically significant link between creativity scores and grade point average (Beghetto, 2016).

One of the most intriguing research findings is the infrequent use of creativity in classroom instruction. Just 45.56% of university students often get all eleven learning creativity experiences on campus. Another problem is a lack of time to implement creativity in learning on campus. Only 37.71% of university students devote significant time to engaging in all eleven learning creativity experiences on campus. It means that more than half of them got a little frequency to implement them and a little time to engage in them on campus. University education cannot provide them with more time and frequency for these activities. Regarding the lack of time and frequency to implement creativity in learning on campus, the function of institutions such as universities should be to provide opportunities for students to explore and experience creativity in many different ways (Ho, 2020) in the curriculum and whole education process.

Then, this research found that there is a positive and significant influence between the importance of university students learning creativity outcomes and the importance of their learning creativity experiences, the frequency of times they get learning creativity experiences on campus in a week and the duration of times they spend on campus engaging in learning creativity experiences in a day. It means that when they wish for the importance of twelve

learning creativity outcomes, they also wish for the importance of eleven learning creativity experiences. Its implication is that to achieve the twelve learning creativity outcomes, the tertiary institution must ensure the implementation of eleven creative learning experiences on campus, as well as the adequacy of the frequency and duration of those experiences. This finding is in line with the opinions of Febrianti and Hasan (2020) and Fitriani (2018) that the influence between learning creativity and learning outcomes is positive and significant. Learning creativity experiences contribute to and have an impact on learning outcomes (Martinez & Tuesca, 2019).

6. Conclusions

There are twelve outcomes and eleven experiences of creativity in learning that are important to university students in the 21st century, with different importance percentage levels. 45.56% of university students often (4 times or more in a week) get all eleven learning creativity experiences on campus. 37.71% of university students spend a lot of time (more than 3 hours in a day) engaging in all eleven learning creativity experiences on campus. There is a positive and significant influence between the importance of university students learning creativity outcomes and the importance of their learning creativity experiences, as well as the frequency and duration of those experiences.

7. Note

The instrument (including the questionnaire and the design of it based on the relevant theories of creativity in learning and research results) of the conducted quantitative research is not published in this article due to lack of space. If the access to the research instrument is needed, please contact the author of this article.

References

Beghetto, R. A. (2016). Creative learning: A fresh look. *Journal of Cognitive Education and Psychology*, *15*(1), 6–23. https://doi.org/10.1891/1945-8959.15.1.6

Bezerra Figueiredo Lima, V., & Soriano de Alencar, E. M. L. (2014). Criatividade em programas de pós-graduação em Educação: práticas pedagógicas e fatores inibidores [Creativity in post-graduation programs in education: Pedagogical practices and inhibiting factors]. *Psico-USF: Bragança Paulista*, *19*(1), 61–72. https://doi.org/10.1590/S1413-82712014000100007

Bialik, M., Bogan, M., Fadel, Ch., & Horvathova, M. (2015). *Character education for the 21st Century: What should students learn?* Center for Curriculum Redesign.

Bledow, R., Frese, M., Anderson, N., Erez, M., & Farr, J. (2009). A dialectic perspective on innovation: Conflicting demands, multiple pathways, and ambidexterity. *Industrial and Organizational Psychology*, *2*(3), 305–337. https://doi.org/10.1111/j.1754-9434.2009.01154.x

Burkšaitienė, N. (2018). How can university learning environment contribute to students' creativity? Lithuanian students' perspective. *Creativity Studies*, *11*(1), 162–171. https://doi.org/10.3846/cs.2018.271

Cachia, R., & Ferrari, A. (2010). *JRC scientific and technical reports*. *Creativity in schools: A survey of teachers in Europe*. Publications Office of the European Union.

Cassia Nakano, de T., & Wechsler, S. M. (2018). Creativity and innovation: Skills for the 21st Century. *Estudos de Psicologia* (*Campinas*), *35*(3), 237–246. https://doi.org/10.1590/1982-02752018000300002

Cropley, A. (2020). Definitions of creativity. In M. A. Runco & S. R. Pritzker (Eds.), *Encyclopedia of creativity* (Vol. 1, pp. 315–322). Academic Press. https://doi.org/10.1016/B978-0-12-809324-5.23524-4

Cropley, D. H., Kaufman, J. C., & Cropley, A. J. (2011). Measuring creativity for innovation management. *Journal of Technology Management and Innovation*, *6*(3), 13–29. https://doi.org/10.4067/S0718-27242011000300002

Daly, Sh. R., Mosyjowski, E. A., Oprea, S. L., Huang-Saad, A., & Seifert, C. M. (2016). College students' views of creative process instruction across disciplines. *Thinking Skills and Creativity*, *22*, 1–13. https://doi.org/10.1016/j.tsc.2016.07.002

Egan, A., Maguire, R., Christophers, L., & Rooney, B. (2017). Developing creativity in higher education for 21st Century learners: A protocol for a scoping review. *International Journal of Educational Research*, *82*, 21–27. https://doi.org/10.1016/j.ijer.2016.12.004

Febrianti, M. I., & Hasan, M. (2020). Contribution of learning style, learning creativity and exploratory interest to students' simulation and digital communication learning outcomes during the Covid-19 pandemic. *Journal of Education Technology*, *4*(4), 404–414. https://doi.org/10.23887/jet.v4i4.29701

Feist, G. J. (2004). The influence of personality on artistic and scientific creativity. In R. J. Sternberg (Ed.), *Handbook of creativity* (pp. 273–296). Cambridge University Press. https://doi.org/10.1017/CBO9780511807916.016

Fitriani, F. (2018). *The correlation between students' creativity and English learning achievement* [Bachelor's Thesis, Muhammadiyah University of Makassar, Indonesia]. https://digilibadmin.unismuh.ac.id/upload/669-Full_Text.pdf

Florida, R. (2006). The flight of the creative class: The new global competition for talent. *Liberal Education*, *92*(3), 22–29.

Forster, J. (2014–2015). The significance of creativity in our lives. *International Journal for Talent Development and Creativity*, *2*(2)–*3*(1), 53–68.

Fritzsche, D. J. (1977). On the relationships of learning style, perceived learning, and performance in an experiential learning environment. *Computer Simulation and Learning Theory*, *3*, 455–462.

GALLUP. (2019). *Creativity in learning*. https://www.gallup.com/education/267449/creativity-learning-transformative-technology-gallup-report-2019.aspx

Glăveanu, V.-P. (2011). How are we creative together? Comparing sociocognitive and sociocultural answers. *Theory and Psychology*, *21*(4), 473–492. https://doi.org/10.1177/0959354310372152

Glăveanu, V. P. (2018). Educating which creativity? *Thinking Skills and Creativity*, *27*, 25–32. https://doi.org/10.1016/j.tsc.2017.11.006

Gonçalves, C, & Lima Rua, O. (2021). Learning creativity and student's performance: An empirical study from Portugal. *E-Revista de Estudos Interculturais*, *9*(3). https://parc.ipp.pt/index.php/e-rei/article/view/4231/2038

Gong, Zh., Soomro, S. A., Nanjappan, V., & Georgiev, G. V. (2021). Creativity methods adoption in higher education: Perspectives of educators and students. *Blucher Proceedings*, *9*(5). https://doi.org/10.5151/ead2021-113

Gormley, K. (2020). Neoliberalism and the discursive construction of "Creativity". *Critical Studies in Education*, *61*(3), 313–328. https://doi.org/10.1080/17508487.2018.1459762

Hee Kim, K., & VanTassel-Baska, J. (2010). The relationship between creativity and behavior problems among underachieving elementary and high school students. *Creativity Research Journal*, *22*(2), 185–193. https://doi.org/10.1080/10400419.2010.481518

Ho, W.-Ch. (2020). Students' perceptions of creativity education: A perspective from Hong Kong, China. *International Journal of Humanities, Arts and Social Sciences*, *6*(6), 244–257. https://doi.org/10.20469/ijhss.6.20003-6

Hosmer, D. W., & Lemeshow, S. (2000). *Applied logistic regression*. John Wiley & Sons, Inc. https://doi.org/10.1002/0471722146

Kaplan, D. E. (2019). Creativity in education: Teaching for creativity development. *Psychology*, *10*, 140–147. https://doi.org/10.4236/psych.2019.102012

Kettler, T., Lamb, K. N., & Mullet, D. R. (2021). *Developing creativity in the classroom: Learning and innovation for the 21st-Century schools*. Routledge. https://doi.org/10.4324/9781003234104

Likert, R. (1932). *Archives of psychology. A technique for the measurement of attitudes* (Vol. 140). R. S. Woodworth (Series Ed.). https://legacy.voteview.com/pdf/Likert_1932.pdf

Mangion, M., & Riebel, J. A. (2023). Young creators: Perceptions of creativity by primary school students in Malta. *Journal of Intelligence*, *11*(3). https://doi.org/10.3390/jintelligence11030053

Martinez, E., G., & Tuesca, R. (2019). Learning styles and gross anatomy assessment outcomes at a Colombian School of Medicine. *Educación Médica*, *20*(2), 79–83. https://doi.org/10.1016/j.edumed.2017.12.012

Newton, L. D., & Newton, D. P. (2014). Creativity in 21st-Century education. *Prospects*, *44*, 575–589. https://doi.org/10.1007/s11125-014-9322-1

Nur Setyaningsih, E., Sunarno, W., & Ariyanto, J. (2022). Hubungan kreativitas dengan hasil belajar siswa pada materi getaran gelombang dan bunyi [The relationship between creativity and student learning outcomes in the material on wave vibrations and sound]. *Paedagogia: Jurnal Penelitian Pendidikan*, *25*(1), 15–30. https://doi.org/10.20961/paedagogia.v25i1.43535

Oakley, B. (2014). *A mind for numbers: How to excel at math and science* (*even if you flunked algebra*). Jeremy P. Tarcher/Penguin.

Paechter, M., Maier, B., & Macher, D. (2010). Students' expectations of, and experiences in e-learning: Their relation to learning achievements and course satisfaction. *Computers and Education*, *54*(1), 222–229. https://doi.org/10.1016/j.compedu.2009.08.005

Robinson, K. (2011). *Out of our minds: Learning to be creative*. Capstone Publishing Limited. https://doi.org/10.1002/9780857086549

Runco, M. A. (2007). *Creativity. Theories and themes: Research*, *development*, *and practice*. Elsevier/Academic Press.

Runco, M. A., & Pagnani, A. R. (2011). Psychological research on creativity. In J. Sefton-Green, P. Thomson, K. Jones, & L. Bresler (Eds.), *Routledge international handbooks*. *The Routledge international handbook of creative learning* (pp. 63–71). Routledge.

Saleh, S. E. (2019). Critical thinking as a 21st Century skill: Conceptions, implementation and challenges in the EFL classroom. *European Journal of Foreign Language Teaching*, *4*(1). https://oapub.org/edu/index.php/ejfl/article/view/2209/4846

Schachtel, E. G. (2001). *Metamorphosis: On the conflict of human development and the psychology of creativity*. Routledge.

Schreuder, E. J. A., & Mioch, T. (2011, 10–11 February). The effect of time pressure and task completion on the occurrence of cognitive lockup. In E. Carrea, A. Greco, & C. Penco (Eds.), *CEUR Workshop Proceedings: Proceedings of HCP 2011 – Fourth Workshop on Human Centered Processes* (pp. 63–74), Genoa, Italy. University of Utrecht.

Smith, J. K., & Smith, L. F. (2010). Educational creativity. In J. C. Kaufman & R. J. Sternberg (Eds.), *The Cambridge handbook of creativity* (pp. 250–264). Cambridge University Press. https://doi.org/10.1017/CBO9780511763205.016

Soriano de Alencar, E. M. L., Souza Fleith, de D., & Pereira, N. (2017). Creativity in higher education: Challenges and facilitating factors. *Trends in Psychology*, *25*(2), 553–561. https://doi.org/10.9788/TP2017.2-09

Sudjana, N. (2011). *Penilaian Hasil Proses Belajar Mengajar* [Assessment of the results of the teaching and learning process]. PT Remaja Rosdakarya.

Winardi, J. (2005). *Entrepreneur dan entrepreneurship* [Entrepreneurs and entrepreneurship]. Kencana.

Yunus, M. (2015). Challenges and alternative of creativity development in higher education. *Journal of Humanity*, *3*(2), 67–77. https://doi.org/10.14724/jh.v3i2.40

Yurdugül, H., & Menzi Çetin, N. (2015). Investigation of the relationship between learning process and learning outcomes in e-learning environments. *Eurasian Journal of Educational Research*, *58*, 57–74. https://doi.org/10.14689/ejer.2015.59.4

Yusuf, K., & Jazilah, N. (2020). Exploring creativity in English writing by using *Instagram*: University students perceptions. *Pedagogy Journal of English Language Teaching*, *8*(2), 80–88. https://doi.org/10.32332/pedagogy.v8i2.2069

Zampetakis, L. A., Bouranta, N., & Moustakis, V. S. (2010). On the relationship between individual creativity and time management. *Thinking Skills and Creativity*, *5*(1), 23–32. https://doi.org/10.1016/j.tsc.2009.12.001