ISSN: 2345-0479 / eISSN: 2345-0487

VILNIUS TECH
Vilnius Gediminas Technical University

CREATIVITY STUDIES

2025
Volume 18
Issue 2
Pages 495–505
https://doi.org/10.3846/cs.2025.19580

CAN SELF-DETERMINATION MOTIVE PREDICT CREATIVE THINKING AMONG UNIVERSITY STUDENTS?

Salem Ali Salem ALGHARAIBEH [1]✉, Thaer A. GHBARI[2], Rana Thani ALMOMANI[3]

[1]*Department of Educational Sciences, Ajloun University College, Al-Balqa Applied University, P.O. Box 206, 19117 As-Salt, Jordan*
[2]*Department of Educational Psychology and Counselling, Faculty of Educational Sciences, Hashemite University, P.O. Box 330127, 13133 Zarqa, Jordan*
[3]*Department of Class Teacher, Faculty of Educational Sciences, Zarqa University, P.O. Box 2000, 13110 Zarqa, Jordan*

Article History:
- received 22 July 2023
- accepted 20 November 2024

Abstract. Creative thinking is considered as one of the important mental processes in success in life in general and in the university, as it plays an important role in the development and progress of societies in all fields, especially considering the scientific and technological revolution and the great acceleration in all areas of life. The progress and development of societies can be measured by the level of their individuals' possession of thinking skills in general and creative thinking. There are many variables that can play an important role in creative thinking, one of these factors is the motivation of self-determination. The current study aimed to reveal the predictive ability of self-determination of creative thinking and whether there are statistically significant differences in them due to gender and college. The sample of the study consisted of 367 university students in Jordan who were selected by the cluster random method. To achieve the objectives of the study, two measures of self-determination motivation and creative thinking scale were used. The results showed that the level of creative thinking among the study sample was low in all dimensions of the scale, and there were no statistically significant differences in creative thinking attributed to gender, except for flexibility in which males outperformed females in a statistically significant way, and there were no differences due to the college variable. The results also indicated that self-determination predicts creative thinking among university students.

Keywords: creative thinking, higher education, motivation, self-determination motive, students, university.

✉Corresponding author. E-mail: ***salem.algharibeh@bau.edu.jo***

1. Introduction

Creative thinking encompasses a comprehensive sequence of cognitive processes employed by individuals to achieve objectives and solve problems. It involves diverse endeavors geared toward addressing challenges and occurrences, leveraging individual cognitive capacities (Mursid et al., 2022). Creative thinking is a cognitive activity marked by a departure from stereotypical and conventional thinking, manifesting in productivity characterized by innovation, novelty, and creativity. This cognitive process incorporates several skills, including fluency, originality, flexibility, and expansiveness (Bazara'a, 2008; Adiansha et al., 2021). Torrance (1980) defines creative thinking as a process wherein individuals become attuned to changes and distinctions in information and identify missing elements. Subsequently, they actively search for clues and indicators within the given situation, gather information to formulate hypotheses regarding these gaps, assess hypotheses, establish connections between outcomes, and engage in iterative adjustments and reassignments.

Creative thinking skills can be defined as a collection of mental abilities employed by individuals to generate novel and meaningful ideas (Elheddaby et al., 2011). Torrance (1980) proposed a model for creative thinking skills, encompassing fluency, which involves the rapid generation of numerous alternatives, synonyms, ideas, or responses to a given stimulus. Originality, constituting novelty and uniqueness, is a central aspect across various definitions of creative thinking and serves as the primary criterion for assessing creativity levels. Another critical skill within this model is flexibility, representing the capacity to produce diverse ideas beyond the expected type, guiding thinking in response to stimulus changes or situational requirements. Lastly, sensitivity to problems denotes an awareness of existing needs, problems, or weaknesses within the environment or situation (Kim, 2006; Smare, 2022).

Due to the significance of creative thinking and its imperative role in societies, researchers have devoted attention to understanding it, as well as the factors that can impact it, encompassing personal, mental, and motivational dimensions. Notably, scholars have explored variables such as hope (Yang et al., 2020) and creative self-efficacy (Copping, 2021; Ďuriš et al., 2023; Zhang et al., 2019) as potential influencers. Additionally, autonomy and ambition, identified as traits of creative individuals, are regarded as components of the broader concept of self-regulation, exerting an influence on creative thinking (Cabra & Guerrero, 2022; Montgomery et al., 1993). The characteristics associated with creative people include independence, self-discipline, and a proclivity to deviate from societal norms. These attributes may underpin the motivation of self-determination, as evidenced by research findings indicating a positive correlation between the motive of self-determination and the creative personality (Chen et al., 2022; Fischer et al., 2019).

The self-determination theory (SDT) constitutes a comprehensive framework encompassing human motivation and personality, rooted in individuals' inherent propensities for growth and intrinsic psychological needs. This theoretical framework is concerned with elucidating the motivations that underlie choices made by individuals devoid of external influence or interference. Emphasizing the extent to which human behaviour is intrinsically driven and self-determined, SDT was expounded by Deci and Ryan (2000, 2012). Ward (1992) defines self-determination as the capacity for individuals to define their own objectives, determine their capability to attain those objectives, and assess the feasibility of realizing their aspirations. Essential attributes of self-determination, according to Ward (1992), include awareness, assertiveness, creativity, pride, and self-affirmation.

The SDT posits that individuals undertake actions aligned with their fundamental psychological needs, which are intrinsic to achieving psychological satisfaction. These needs encompass competence, independence, and relatedness. Deci and Ryan (2000) assert that competence arises from a sense of accomplishment derived from successful experiences and positive emotions associated with an activity. The observation of students engaged in exploration of their environment, their interactions with surroundings, expressions of joy on their faces, and a sense of satisfaction are indicative of competence (Benedek et al., 2021; Holt, 1964; Smare & Elfatihi, 2023).

Autonomy is realized when individuals are granted the freedom to choose and the opportunity to direct themselves, leading to heightened feelings of self-satisfaction. Relatedness pertains to the intrinsic desire to establish connections with others and experience love and

care. Autonomy and relatedness are interconnected and jointly influence student achievement. Stanley et al. (2008) posit that cultivating positive relationships within the educational context is crucial for academic reform. In essence, the establishment of such connections is viewed as pivotal to fostering autonomy and relatedness, thereby contributing to students' overall academic success.

Research endeavors have explored the nexus between self-determination motive and creative thinking. For instance, Sheldon (1995) conducted a study revealing the alignment of self-determination dimensions with creative thinking dimensions. The research showed that creative individuals often reported more supportive parents regarding independence, suggesting that a general inclination toward self-determination may align with deeper cognitive resources within creative individuals.

Varied findings emerge concerning creative thinking, with studies indicating diverse perspectives. Some authors (Elheddaby et al., 2011) found weak creative thinking skills among university students, with females displaying greater creativity than males. Salimi et al. (2012) asserted that creativity can be predicted by self-determination dimensions – relatedness, autonomy, and competence. Suwanti (2019) found that self-determination influences knowledge sharing and creativity, while other authors (Chen et al., 2022) highlighted a positive relationship between self-determination in physical exercise and college students' creative personality, indicating a predictive role for self-determination in fostering creativity.

In light of the foregoing, this study seeks to examine the potential relationship between self-determination motive and creative thinking, specifically exploring the role of self-determination in influencing creative thinking among university students in Jordan.

2. Problem statement

Higher education institutions consistently aim to enhance student outcomes by prioritizing cognitive processes, particularly creative thinking, and fostering students' autonomy and self-determination. Consequently, it is imperative to explore factors influencing creative thinking, including the role of self-determination and its potential correlation with creative thinking. Notably, there is a paucity of research in this domain within the Arab world, underscoring the need for a deeper understanding of creative thinking and its association with the self-determination motive among university students. The present study endeavors to address the following inquiries:

1. What is the level of creative thinking among the university students?
2. Are there statistically significant differences in creative thinking among university students due to gender and college?
3. Can creative thinking be predicted by self-determination motive among university students in Jordan?

By addressing these questions, the study aims to contribute valuable insights into the levels of creative thinking, potential disparities based on gender and college, and the predictive relationship between self-determination motive and creative thinking among university students in Jordan.

3. Method

3.1. Participants

A total of 367 (269 females – 73.3%, 98 males – 26.7%), and college (205 humanities colleges – 55.9%, 162 scientific colleges – 44.1%). They were randomly selected from some universities in Jordan. They were enrolled in bachelor programmes in the academic year 2022–2023. They were selected purposively from different courses. They responded to the study tools creative thinking scale and a self-determination motivation scale which were designed and uploaded in *Google Forms*. Completing the scales takes about 30 minutes.

3.2. Measures

3.2.1. Creative thinking scale

This scale prepared by Alhayek and Omoush (2017) it was built after reviewing many studies related to creative thinking (Alhayek & Al-Gawabia, 2013; Alhayek et al., 2014; Al-Shamayleh, 2015). The scale consisted of 40 items distributed four creative thinking skills: 1) fluency (10 items), 2) originality (10 items), 3) flexibility (10 items), and 4) sensitivity to problems (10 items). The items of the scale are answered according to the five-point Likert scale (1) not applicable at all to (5) always applicable, all items have been positively formulated.

The validity of the scale was verified by extracting the corrected correlation coefficients which were ranged from 0.24 to 0.721. Cronbach's alpha of internal consistency was also calculated, and alpha coefficient values were as following: fluency (0.816), originality (0.605), flexibility (0.785), and sensitivity to problems (0.785), all of which are appropriate indicators of the scale's reliability.

3.2.2. Self-determination scale

The self-determination scale developed by Sheldon et al. (1996) was employed to measure the self-determination motive. The scale consists of six dimensions: 1) enjoyment and importance, 2) perceived competence, 3) effort and interest, 4) perceived choices, 5) value and benefit, and 6) relationships. The scale consists of 45 items scored according to the five-point Likert scale. The response scores on the scale range from (1) not applicable at all to (5) always applicable. The second item of the fourth dimension is negative formulated.

The validity of the self-determination motivation scale was verified by extracting the corrected correlation coefficients between the item and its dimension, the values were ranged from 0.216 to 0.561. Five items were deleted because they were less than .20 correlation value, thus the final version composed of (40) items. Cronbach's alpha of internal consistency was also calculated, and alpha coefficient values were as following: enjoyment and importance (0.668), perceived competence (0.752), effort and interest (0.631), perceived choices (0.660), value and benefit (0.645), and relationships (0.647), all of which are appropriate indicators of the scale's reliability.

3.3. Procedures

After identifying the study problem, scales were developed and uploaded to *Google Forms*. Subsequently, approval was obtained from university administration to implement the scales.

Following this, the target population for applying the scales was identified, and a consent form was uploaded, requesting participants to fill it out. This form granted them the freedom to participate in the study and withdraw at their discretion. Responding to the scales took approximately 30 minutes.

Upon completion of the scales, responses were collected and statistically analyzed using the statistical package in the social sciences.

3.4. Data analysis

A variety of statistical analyses were employed in this study, including measures of central tendency such as means and standard deviations. Additionally, multivariate analysis of variance (MANOVA) was utilized due to the multidimensional nature of the predictor variable. Pearson correlation coefficient and stepwise regression analysis were also applied.

3.5. Results

To find out the level of creative thinking and its skills, means and standard deviations were extracted (see Table 1).

Table 1. Means and standard deviations of the creative thinking scale dimensions (source: created by authors)

	Means	Standard deviation	Level
Fluency	22.70	5.913	Low
Originality	22.01	5.649	Low
Flexibility	20.80	5.492	Low
Sensitivity to problems	19.50	5.506	Low
Total creative thinking	85.00	18.945	Low

Note: The levels of creative thinking were judged by calculating the difference between the highest and lowest score on each dimension and dividing the result by three levels.

To reveal the significance of the differences in the dimensions of creative thinking due to gender and college, a two-way MANOVA was used (see Table 2).

Table 2 shows that there are no statistically significant differences in creative thinking dimensions due to gender, except for flexibility ($F = 4.915$, $p < 0.027$), the differences in flexibility were in favor of males. Regarding the college variable, there were no statistically significant differences in all dimensions of the creative thinking scale.

To identify the predictive ability of self-determination motive in creative thinking, correlation coefficients were extracted between self-determination dimensions and creative thinking dimensions. As shown in Table 3.

Table 3 indicates that all correlation coefficients between the different dimensions of the two scales were positive and statistically significant. To examine the self-determination ability to predict creative thinking, a multiple regression analysis was performed using the enter method. Table 4 shows the results.

Table 2. Multivariate analysis of variance for the differences in creative thinking which were due to gender and college (source: created by authors)

Hotelling's *T*-squared distribution		Dependent variables	Sum of squares	Difference	Mean square	*F*-test	Significance
Value: 0.016 Significance: 0.227	Fluency	Gender	28.117	1	28.117	0.801	0.371
	Originality		32.065	1	32.065	0.999	0.318
	Flexibility		147.460	1	147.460	4.915	0.027
	Sensitivity to problems		28.648	1	28.648	0.943	0.332
Value: 0.009 Significance: 0.502	Fluency	Specialty	0.015	1	0.015	0.000	0.983
	Originality		2.807	1	2.807	0.087	0.768
	Flexibility		16.368	1	16.368	0.550	0.459
	Sensitivity to problems		12.465	1	12.465	0.410	0.522
	Fluency	Error	12737.488	363	35.089		
	Originality		11645.691	363	32.082		
	Flexibility		10811.890	363	29.785		
	Sensitivity to problems		11029.344	363	30.384		
	Fluency	Corrected total	12797.428	366			
	Originality		11679.989	366			
	Flexibility		11037.673	366			
	Sensitivity to problems		11093.749	366			

Table 3. Correlation coefficients between self-determination motive dimensions and creative thinking dimensions (source: created by authors)

	Fluency	Originality	Flexibility	Sensitivity to problems
Enjoyment and importance	0.487**	0.446**	0.432**	0.400**
Perceived competence	0.406**	0.427**	0.377**	0.357**
Effort and interest	0.399**	0.391**	0.412**	0.376**
Perceived choices	0.457**	0.466**	0.476**	0.389**
Value and benefit	0.419**	0.465**	0.464**	0.495**
Relationships	0.448**	0.354**	0.420**	0.303**

Table 4 shows that all self-determination dimensions explain 72% of the variance in creative thinking among university students. To find out the predictive ability of self-determination dimensions in creative thinking, the standardized weights of self-determination dimensions were determined. The highest contribution was from value and benefits dimension (β = 0.266), followed by enjoyment and importance (β = 0.214), then perceived choices (β = 0.213), relationships (β = 0.199), and finally, effort and interest (β = 0.100), while perceived competence did not predict creative thinking significant.

Table 4. Multiple regression analysis for self-determination dimensions with creative thinking (source: created by authors)

Variable	Coefficient of determination		Significance	Standardized coefficient	Beta distribution	*t*-statistic	Significance
Model 1	0.720	64.644	0.000	–	–	–	–
Constant				9.984	–	2.401	0.017
Enjoyment and importance				0.835	0.214	4.638	0.000
Perceived competence				0.095	0.020	0.406	0.685
Effort and interest				0.611	0.100	2.195	0.029
Perceived choices				0.980	0.213	4.754	0.000
Value and benefit				1.593	0.266	6.046	0.000
Relationships				1.024	0.199	4.898	0.000

4. Discussion

The findings of the investigation revealed a pervasive deficiency in the creative thinking abilities of university students across various dimensions of the creative thinking scale. This deficiency could be attributed to a tendency among some students to adhere to conventional thinking methods acquired through prior educational experiences, resisting exploration of innovative approaches despite the university's provision of both curricular and extracurricular activities designed to foster creative thinking (Alwani, 2016). Moreover, the imposition of a dictatorial teaching style by certain academic lecturers may contribute to the inhibition of creativity. Suboptimal levels of interest in creative thinking and participation in university activities could also be influential factors (Hariri & Kassis, 2017).

Furthermore, the dearth of emphasis on creative thinking skills within university faculty, particularly in Middle East institutions, presents a notable challenge. Insufficient faculty proficiency in nurturing creative thinking skills, as identified by DeHaan (2009), constitutes a significant hurdle to the cultivation of creative thinking among students. The subpar teaching environment adversely impacts students' creativity, constraining their capacity for innovation and creation. Additionally, the persistence in employing traditional educational methodologies is implicated as a negative influence on the development of creative thinking skills (Roy, 2013). These study outcomes align with previous research by some authors (Elheddaby et al., 2011), which similarly identified deficiencies in students' creative thinking abilities.

The results further revealed that there were no statistically significant differences in various facets of creative thinking based on gender and college affiliation, except for the flexibility dimension, where statistically significant differences were observed favoring males. This disparity may be elucidated by the inclination of male students towards rapid adaptability

and flexibility in response to the challenges encountered during their university studies and various practical engagements. The elevated flexibility exhibited by males might also be ascribed to a general tendency of females to experience difficulty in adjusting to novel situations arising in the course of university studies, professional endeavors, and other activities.

Several factors could contribute to the observed superior flexibility of males over females. In the Arab cultural context, females are often characterized by a greater degree of steadfastness and rigidity in their interactions with unfamiliar individuals and diverse life situations, driven by apprehension of potential failure. Consequently, this resolute stance among females may play a role in diminishing their flexibility levels.

The findings of this investigation deviated from those of some authors (Elheddaby et al., 2011), who observed notable gender-related distinctions in creative thinking favoring females. The researchers postulate that the absence of a significant variance in creative thinking dimensions within the sampled population based on gender and specialization could be explained by the similarity in creative thinking between males and females. Consequently, the study suggests that the nature of specialization does not exert a discernible impact on creative thinking or its diverse facets, indicating that specialization lacks a significant influence on creative thinking and its associated skills.

The findings additionally demonstrated that 72% of the variability in creative thinking could be accounted for by dimensions of self-determination, thus making a substantial contribution to the predictive modeling of students' creative thinking. This outcome can be rationalized by the anticipation that individuals with heightened self-determination are likely to exhibit elevated levels of creative thinking. It is posited that those engaging in creative thinking typically manifest an autonomous disposition, eschewing adherence to conventional norms and displaying deviation from the commonplace. This aligns with existing theoretical literature, which posits independence in thought and action as a hallmark of creative individuals. Moreover, the outcome may be elucidated by the convergence of certain aspects of self-determination and creative thinking, including autonomy, self-regulation, self-discipline, and departure from conventional norms. This convergence is supported by prior research (Chen et al., 2022; Fischer et al., 2019; Montgomery et al., 1993), underscoring the interrelated nature of these constructs.

5. Limitations and future research

The generalization of the results of this study is determined based on several factors, including the fact that the utilized measures are of the self-report type. Therefore, the accuracy of the results depends on the objectivity of participants' responses. Additionally, the number of participants may not be large enough, but this was facilitated for researchers due to certain administrative constraints.

Despite these limitations, the results may have practical utility. The findings of the current study could benefit faculty staff in universities, as they inform them about the characteristics of students, specifically self-determination and its relationship to creative thinking. Moreover, the results of this study could be valuable for all institutions concerned with creative thinking. That is, by understanding the associated factors, they can develop programmes to train creative thinking.

Based on the above, there is potential for increasing research related to creative thinking and addressing various variables, such as the big five personality factors, mindfulness, flow state, motivational patterns, *etc*.

6. Conclusions

In the realm of societal progress and advancement, creative thinking stands out as a pivotal cornerstone. Evaluating the development of populations and societies often involves assessing the extent of their creative thinking capabilities. Consequently, it becomes imperative to prioritize and cultivate this form of cognitive prowess among students across diverse educational strata.

The investigation determined that the extent of creative ideation within the university student population in Jordan is notably low. This underscores the imperative to advocate for a heightened emphasis on fostering creative thinking among students in general, with a specific focus on university students. This emphasis is warranted by the pivotal role of creative thinking in societal advancement and alignment with global developmental trajectories across various domains. It is recommended that university authorities initiate endeavors to establish programmes and events aimed at incentivizing students to participate in extracurricular activities. Such initiatives are pivotal in nurturing individual self-determination, thereby positively influencing their capacity for creative thinking.

If academic institutions endeavor to enhance students' motivation for self-determination, it is anticipated that such efforts will yield positive outcomes, manifested in heightened levels of self-determined confidence, improved decision-making capabilities, and a transition from conventional thought patterns to more innovative thinking styles. One potential avenue to foster this progression involves encouraging researchers to undertake a variety of comprehensive studies addressing self-determination and creative thinking. These studies should encompass diverse samples across various age groups and educational stages.

The researchers anticipate that the dissemination of knowledge regarding the concept and significance of creative thinking will significantly enhance the appreciation for this pivotal cognitive process. Institutions of higher learning and official organizations are encouraged to provide robust support for scholars engaged in creative thinking research. This support aims to stimulate further investigations, fostering advancements that address impediments to development and progress. Such endeavors are essential for aligning with societal needs, attaining a satisfactory quality of life, and promoting prosperity for all.

References

Adiansha, A. A., Sani, K., Sudarwo, R., Nasution, N., & Mulyadi, M. (2021). Brain-based learning: How does mathematics creativity develop in elementary school students? *Premiere Educandum: Jurnal Pendidikan Dasar dan Pembelajaran*, *11*(2), 191–202. https://doi.org/10.25273/pe.v11i2.8950

Al-Shamayleh, S. (2015). *The effect of an educational computerized curriculum using problem-solving strategy on teaching some gymnastics skills and developing reflective thinking and motor creativity among female students in the Kingdom of Bahrain* [Master's Thesis, University of Jordan]. Jordan. https://search.mandumah.com/Record/720051

Alhayek, S., & Al-Gawabia, T. (2013). *The effect of an instructional program for learning gymnastic skills by using modern teaching strategy on primary stage pupil's creative thinking*. https://search.shamaa.org/PDF/Books/Jo/UOJ/TAIRNo1/2013_algawabiat_115519_241-256.pdf

Alhayek, S., Alkour, A., & Alhayek, F. (2014, 19–20 March). The effect of using six hats strategy in the warming-up of physical education class on the development of innovation thinking skills for the seventh grade students. In *The International Conference of Sport Science Challenge of Change*, University of Jordan, Jordan. https://search.shamaa.org/FullRecord?ID=248082

Alhayek, S., & Omoush, A. (2017). The most common teaching strategies in swimming courses and its relationship with innovative thinking in Jordanian universities. *Dirasat: Educational Sciences*, *44*(4), 39–65.

Alwani, H. (2016). *The role of extracurricular activities in highlighting the creative traits of primary school students from the teachers' point of view: A field study of some elementary schools in the State of Oum El Bouaghi* [Master's Thesis, University of Oum El Bouaghi], Algeria [unpublished source].

Bazara'a, E. (2008). *Evaluate Arabic teachers in teaching reading in the light of the basic skills for developing creative thinking in the first secondary school students in Makkah* [Master's Thesis, Umm al-Qura University], Saudi Arabia. https://search.mandumah.com/Record/531234

Benedek, M., Karstendiek, M., Ceh, S. M., Grabner, R. H., Krammer, G., Lebuda, I., Silvia, P. J., Cotter, K. N., Li, Y., Hu, W., Martskvishvili, K., & Kaufman, J. C. (2021). Creativity myths: Prevalence and correlates of misconceptions on creativity. *Personality and Individual Differences*, *182*. https://doi.org/10.1016/j.paid.2021.111068

Cabra, J. F., & Guerrero, C. D. (2022). Regional creativity: Cultural and socio-economic differences. *Journal of Creativity*, *32*(2). https://doi.org/10.1016/j.yjoc.2022.100022

Chen, Sh., Wang, Q., Wang, X., Huang, L., Zhang, D., & Shi, B. (2022). Self-determination in physical exercise predicts creative personality of college students: The moderating role of positive affect. *Frontiers in Sports and Active Living*, *4*. https://doi.org/10.3389/fspor.2022.926243

Copping, A. J. (2021). *Exploring the influence of creative thinking on the pedagogy of primary-aged children's writing* [Doctoral/PhD Thesis, Lancaster University], United Kingdom. https://insight.cumbria.ac.uk/id/eprint/6243/1/A.%20Copping%20PhD%20thesis%20final.docx.pdf

Deci, E. L., & Ryan, R. M. (2012). Self-determination theory. In van P. A. M. Lange, A. W. Kruglanski, & E. T. Higgins (Eds.), *Handbook of theories of social psychology* (Vol. 1, pp. 416–436). Sage Publications Ltd. https://doi.org/10.4135/9781446249215.n21

Deci, E. L., & Ryan, R. M. (2000). The "What" and "Why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry: An International Journal for the Advancement of Psychological Theory*, *11*(4), 227–268. https://doi.org/10.1207/S15327965PLI1104_01

DeHaan, R. L. (2009). Teaching creativity and inventive problem solving in science. *CBE – Life Sciences Education*, *8*(3), 172–181. https://doi.org/10.1187/cbe.08-12-0081

Ďuriš, V., Vasileva, L. N., Chumarov, S. G., & Trofimova, I. G. (2023). Development of creative thinking skills of bachelor engineers based on STEM technology. *TEM Journal: Technology*, *Education*, *Management*, *Informatics*, *12*(2), 1211–1217. https://doi.org/10.18421/TEM122-67

Elheddaby, D., Elfolfoly, H., & Elaley, T. (2011). Creative thinking skills level among students–teachers in the scientific departments of education and applied sciences college. *Arab Journal of Excellence Development*, *3*(2), Article 34.

Fischer, C., Malycha, Ch. P., & Schafmann, E. (2019). The influence of intrinsic motivation and synergistic extrinsic motivators on creativity and innovation. *Frontiers in Psychology*, *10*. https://doi.org/10.3389/fpsyg.2019.00137

Hariri, N., & Kassis, G. (2017). The cultural and creative sector in 5 Arab Mediterranean countries: Skill-mismatch and active labour market policies. *European Scientific Journal*, *13*(1), 182–197.

Holt, J. (1964). *How children fail*. A Delta Book.

Kim, K. H. (2006). Can we trust creativity tests? A review of the Torrance Tests of Creative Thinking (TTCT). *Creativity Research Journal*, *18*(1), 3–14. https://doi.org/10.1207/s15326934crj1801_2

Montgomery, D., Bull, K. S., & Baloche, L. (1993). Characteristics of the creative person: Perceptions of university teachers in relation to the professional literature. *American Behavioral Scientist*, *37*(1), 68–78. https://doi.org/10.1177/0002764293037001007

Mursid, R., Saragih, A. H., & Hartono, R. (2022). The effect of the blended project-based learning model and creative thinking ability on engineering students' learning outcomes. *International Journal of Education in Mathematics, Science and Technology*, *10*(1), 218–235. https://doi.org/10.46328/ijemst.2244

Roy, J. (2013). Elementary teacher perceptions of teaching practices that foster creative thinking in students. *Inquiry: The University of Arkansas Undergraduate Research Journal*, *14*(1), 75–94.

Salimi, J., Yoosefi, N., & Karimi, M. (2012). A study of relationship between fulfill of basic psychological needs (relationship with others, autonomy and competence) and creativity in male and female students in secondary school. *Journal of Educational Psychology Studies*, *9*(16), 56–80.

Sheldon, K. M. (1995). Creativity and self-determination in personality. *Creativity Research Journal*, *8*(1), 25–36. https://doi.org/10.1207/s15326934crj0801_3

Sheldon, K. M., Ryan, R., & Reis, H. T. (1996). What makes for a good day? Competence and autonomy in the day and in the person. *Personality and Social Psychology Bulletin*, *22*(12), 1270–1279. https://doi.org/10.1177/01461672962212007

Smare, Z. (2022). The need to engage students' creative thinking in language learning classes. *TESOL and Technology Studies*, *3*(2), 18–33. https://doi.org/10.48185/tts.v3i2.644

Smare, Z., & Elfatihi, M. (2023). A systematic review of research on creative thinking in primary education: Focus on empirical methodologies. *Issues in Educational Research*, *33*(2), 752–780.

Stanley, K. R., Spradlin, T. E., & Plucker, J. A. (2008). Calculating high school graduation rates. *Education Policy Brief*, *6*(5). https://files.eric.ed.gov/fulltext/ED503862.pdf

Suwanti, S. (2019). Intrinsic motivation, knowledge sharing, and employee creativity: A self-determination perspective. *International Journal of Scientific and Technology Research*, *8*(7), 623–628.

Torrance, E. P. (1980). Lessons about giftedness and creativity from a nation of 115 million overachievers. *Gifted Child Quarterly*, *24*(1), 10–14. https://doi.org/10.1177/001698628002400103

Ward, M. (1992). The OSERS initiative on self-determination. *Interchange*, *12*, 1–7.

Yang, Y., Xu, X., Liu, W., & Pang, W. (2020). Hope and creative self-efficacy as sequential mediators in the relationship between family socioeconomic status and creativity. *Frontiers in Psychology*, *11*. https://doi.org/10.3389/fpsyg.2020.00438

Zhang, Y., Liu, W., Liu, Y., Huang, Zh., & Liu, Q. (2019). Chinese college students' optimism and social creativity mediated by creative self-efficacy and hope. *Social Behavior and Personality: An International Journal*, *47*(7), 1–9. https://doi.org/10.2224/sbp.8268