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Build an Assessment Rubric of Student Creativity in Higher Education

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Abstract

Attention to student creativity has triggered a number of educational transformations in higher education. However, widespread measures of creativity in higher education are primarily based on a norm-referenced assessment, which provides minimal information on student performance against the learning development in creativity. In response to the lack of effective measures and criteria to link assessment with instruction in creativity education, this article discusses the process of building an assessment rubric of creativity based on the standards-referenced model. It is intended to help teachers and students better understand the learning objectives related to creativity, as well as to monitor and guide the development of student creativity.

Keywords: *creativity; assessment rubric; standards-referenced model; performance standard; higher education.*

1. Introduction

Creativity has been regarded as the 3rd in-demand employability skill in the next five years according to a report 'The Future of Jobs' from the World Economic Forum (Anon, 2020). The increasing value of creativity in the labor market has driven the focus on higher education as one of the most critical skills for the 21st century (Bapna *et al.*, 2017). Fostering and developing creativity is consistently recognised in higher education (Livingston, 2010; Egan *et al.*, 2017; Gaspar & Mabic, 2015). As a key component of education, effective assessments can provide a wealth of evidence for improving teaching and learning (Wilson & Scalise, 2006).

However, the lack of effective creativity assessment inadvertently hinders teachers from identifying and monitoring creativity development in students (Ehtiyar & Baser, 2019). Psychometric tests of creativity, widely used at all levels of the education system, are based on a norm-referenced assessment and can only provide minimal information about what students know and can do in relation to creativity. In this paper, the process of building an assessment rubric of creativity based on the general procedures proposed by Tognolini (2018) is discussed to provide a new possibility for the future development of creativity assessment in higher education.

2. Limitations of current measures of creativity in higher education

A summary of existing creativity measures reflects the widespread use of psychometric tests in creativity assessment in higher education (Bapna et al., 2017). In higher education, the priority of representing and measuring student creativity will be given to the creative process and the creative outcome. The creative process, referring to the development of thoughts and actions toward original and appropriate outcomes (T. I. Lubart, 2001), can be examined through various tests of divergent thinking, such as Guilford's Alternate Uses Test (AUT) and Torrance's Test of divergent thinking (TTCT) (Guilford, 1966; Torrance & Ball, 1984). On the other hand, creative outcomes focus on the destination of the creative process (Barron, 1955), which is typically measured by the Consensual Assessment Technique (CAT), a subjective evaluation judged by experts or participants on a Likert scale without specific criteria for the rating (Amabile, 1982).

For instance, in investigating the effects of different teaching strategies, including brainstorming and games, on adult students' creativity, Tsai (2013) applied the CAT to measure the creative outcomes of students' collages. Similar studies related to the relationship between brainstorming techniques and creativity have used idea generation tasks from the TTCT or the CAT to measure student creativity (Al-Samarraie & Hurmuzan, 2018). In a study analysing the prediction of creativity and critical thinking on students' success in

completing excellent programs, creativity was represented by the fluency index in the AUT (Leest & Wolbers, 2021).

However, the assessment theory that underpins tests of divergent thinking is the traditional norm-referenced model, in which creativity is scored by comparing students' performance with their peer cohort (Torrance & Ball, 1984; Pi, Hong, & Hu, 2019), rather than against a pre-determined standard. The meaning behind the numbers of measures is more important than the numbers themselves because it provides meaningful information about what students know and can do with respect to a construct, helping teachers better understand students' creativity and develop appropriate instructions (Tognolini, 2018). Findings from an investigation of student and teacher perceptions of creativity at the University of Mostar underline the significance of building a rubric as a common and explicit learning goal to promote creativity education (Gaspar & Mabic, 2015). Understanding the fairness and equity of an assessment rubric, Cuenca and his colleagues (2016) established a holistic rubric on innovation, creativity, and entrepreneurship in the undergraduate curriculum, although it is criteria-based that only demonstrates different levels of output characteristics, rather than cognitive development.

The contention is that if a rubric designed to measure student creativity could be developed to provide evidence of student performance related to creativity, it would be possible to position students along with a rubric that would measure student creative performance in terms of what they know and what they can do. Once this is done, it will be possible to foster and assess student performance in creativity in daily instruction.

3. Standards-referenced assessment

Unlike norm-referencing, where student achievement is measured by comparing it to that of their peers, standards-referencing measures student development by referencing student achievement on a construct-related assessment rubric. The standards-referenced model is built upon the criterion-referenced model. Instead of concentrating on expected behaviors in specific courses or examinations, standards-referencing produces a pre-determined scale using items to define growth along a developmental continuum (Andrich & Marais, 2019; Bond & Fox, 2007). A progression continuum can describe what students should know and can do about knowledge, skills, and understandings in a learning area at different progressive stages (Masters & Forster, 2010).

Generally, there are three steps to building up an assessment rubric (Tognolini, 2018). The first step is to clearly define the construct, which is creativity in this case. Second, a set of progress variables aligned with the definition will be identified as the components of the measurement. Finally, the levels of learning achievements which refer to performance standards, will be used to provide a qualitative interpretation of student performance relative

to the rubric. Take creativity as an example, its performance standards should answer how much students have performed along the developmental trajectory of creativity. Once an assessment rubric is developed, it is still a long way from being finalised and needs to go through multiple rounds of the validation process to ensure the effectiveness and objectivity of the rubric in practice.

4. Process of building an assessment rubric of creativity

This section demonstrates the process of building an assessment rubric for measuring creativity in higher education based on the standards-referenced model, as shown in Figure 1. It is not intended to generate a uniform definition and rubric of creativity, but to perceive the process and adapt it to a variety of educational settings to suit different educational goals.

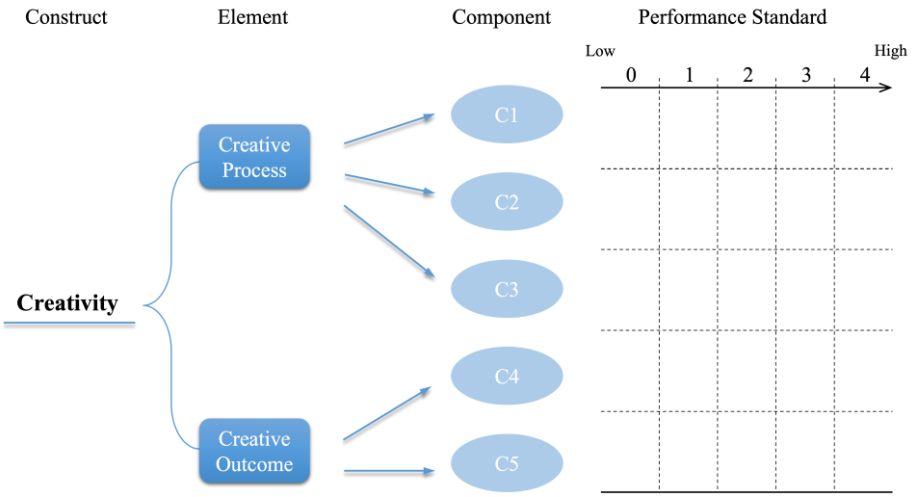

Figure 1. The procedure of building an assessment rubric of creativity

4.1. Define the construct

Creativity is well understood as a multifaceted capability that involves different influences, such as divergent thinking, personality, motivation, and even environmental factors (Lubart, 2011). Instead of answering the question, 'what tools can be used to measure creativity', educators should first consider 'what is it going to measure in relation to creativity' (Runco, 2009). Evaluating all factors simultaneously can disrupt the creative process, and the validity of assessing each factor separately at different times needs to be questioned (Fryer, 2009)

The excessive focus on creative outcomes in higher education has been criticised for some time, and there is a growing call for attention to and measurement of creative processes because of its ongoing impact on competency development (Runco, 2009). A study on the

development of criteria to assess creative outcomes in accounting programs reflects the dominant role of "product-oriented" measures of creativity in higher education (Rensburg et al., 2021). It is well known that there is no universal definition of creativity to date, and different definitions of creativity serve different purposes. A contextualised and appropriate definition of creativity should be in alignment with a specific purpose. If a consensus can be reached on the value of the creative process and the product within a particular context, it is important to develop a clear definition of creativity that includes these two important elements.

4.2. Deconstruct the definition and identify observable components

If the creative process and creative outcome are recognised as the two main elements of the definition, the next step is to break them down and select crucial and measurable components regarding the process and product that match the goals and context. Either a 'top-down' process, a 'bottom-up' process, or a mixture of both can be used to determine the observable variables as the components of the measurement.

A 'top-down' approach starts with a literature review. By critically reviewing literature associated with the targeted element, appropriate and observable variables can be selected and synthesized as the components of the rubric. Take the creative process as an example, the components in the Four-Stage model (Wallas, 1926) and its associated theories can be the starting point, where the concept of the creative process can be extended to the creative potential for different purposes (Lubart, 2011). A protocol of a scoping review of the literature presented by Egan et al. (2017) is an example of a research-based process in defining creativity. It is worth noting that multiple influential factors in the creative process make it easy to get lost in identifying measurement indicators. Constantly reviewing the purpose and context of classroom assessment can be effective in helping to select the appropriate components.

An opposite approach is a "bottom-up" process, where components are selected from experienced lecturers or policymakers through empirical data such as interviews or surveys. The process of developing the Six-Facet-Model, which summarises six channels for observing student creativity through interviews and online surveys with lecturers, is a typical "evidence-based" approach (Jankowska & Karwowski, 2015). Considering the advantages and disadvantages of both methods, using a hybrid approach for the construction and validation process can enhance the effectiveness of the rubric.

4.3. Describe performance standards

Performance standards, also called a developmental continuum, describes the typical order of learning development about the knowledge, skills, and understandings of a learning area (Masters & Forster, 2010). It clarifies how well the students perform in relation to the

construct (Tognolini & Davidson, 2012). When it comes to creativity, it is easy to fall into the trap of focusing on the characteristics of the output and ignoring the description of learning development, especially when students' creativity is assessed only through creative products. One strategy to effectively avoid this mistake is to think about "why a student can reach this level or why a student can produce this output".

In addition, different taxonomies of learning, such as Bloom's Revised Taxonomy (BRT) and the Structure of Observed Learning Outcomes (SOLO) Model, can be utilised to better describe and distinguish between different levels of performance standards. Moreover, accessible language should be used in performance standards to make them user-friendly, since the customers of the assessment rubric are teachers who are already overloaded with tasks in their daily teaching.

Once an assessment rubric of creativity is developed, the opposing view between teachers and students on the evaluation of creativity cultivation in higher education (Gaspar & Mabic, 2015; Ehtiyar & Baser, 2019) can be overcome. Teachers and students can get a comprehensive understanding of their learning objectives because the construct of creativity is clearly described in the definition of the first step and is continuously unpacked in the next step with specific descriptions provided in the rubric.

5. Conclusion

The prominent role of a rubric and the need for criteria in measuring creativity have been recognised in promoting creativity education in university education (Ehtiyar & Baser, 2019). Assessment rubrics based on the standards-referenced model have become an emerging topic in measuring individual competency as its effectiveness in linking assessment to instructions (James Tognolini, 2018). The application of assessment rubrics of creativity allows teachers to monitor students' learning progress over time and adjust their scaffolded instruction accordingly, while students can self-monitor their progress in a timely manner by referencing their performance to the standards. This article conceptualises an assessment rubric of creativity based on the standards-referenced model, which can be further achieved through an in-depth analysis of the literature and a wealth of information from educational practice.

References

Al-Samarraie, H., & Hurmuzan, S. (2018). A review of brainstorming techniques in higher education. *Thinking Skills and Creativity*, 27, 78-91. doi: 10.1016/j.tsc.2017.12.002

Amabile, T. M. (1982). The social psychology of creativity: A consensual assessment technique. *Journal of Personality and Social Psychology, 45(2)*(5), 357-376. doi:10.1037/0022-3514.45.2.357

Andrich, D., & Marais, I. (2019). A course in Rasch Measurement Theory. *Measuring in the Educational, Social and Health Sciences*, 41-53. doi:10.1007/978-981-13-7496-8

Anon. (2020). *The future of jobs report 2020*. Retrieved from Geneva: https://www.weforum.org/reports/the-future-of-jobs-report-2020.

Bapna, A., Sharma, N., Kaushik, A., & Kumar, A. (2017). *Handbook on Measuring 21st Century Skills*. doi: 10.13140/RG.2.2.10020.99203

Barron, F. (1955). The disposition toward originality. *The Journal of Abnormal and Social Psychology, 51*(3), 478-485. doi:10.1037/h0048073

Bond, T. G., & Fox, C. (2007). *Fundamental Measurement in the Human Sciences.* Chicago, IL: Institute for Objective Measurement.

Cuenca, L., Alarcón Valero, F., Boza, A., Fernández Diego, M., Ruiz Font, L., Gordo Monzó, M. L., . . . Alemany Díaz, M. d. M. (2016). Rubric to assess the competence of innovatoon, creativity and entrepreneurship in bachelor degree. *Brazilian Journal of Operations and Production Management, 13*(1), 118-123. doi: 10.14488/BJOPM.2016.v13.n1.a14

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. doi: 10.1016/j.ijer.2016.12.004

Ehtiyar, R., & Baser, G. (2019). University Education and Creativity: An Assessment From Students' Perspective. *Eurasian Journal of Educational Research, 19*, 1-20. doi: 10.14689/ejer.2019.80.6

Fryer, M. (2009). Promoting creativity in education and the role of measurement. *Measuring creativity*, 327.

Gaspar, D., & Mabic, M. (2015). Creativity in higher education. *Universal Journal of Educational Research, 3*(9), 598-605. doi: 10.13189/ujer.2015.030903

Guilford, J. P. (1966). Measurement and creativity. *Theory Into Practice*, 5(4), 185-189. doi: 10.1080/00405846609542023

Jankowska, D., & Karwowski, M. (2015). Measuring creative imagery abilities. *Frontiers in Psychology*.

Janse van Rensburg, C., Coetzee, S. A., & Schmulian, A. (2021). Developing digital creativity through authentic assessment. *Assessment & Evaluation in Higher Education*, 1-21. doi: 10.1080/02602938.2021.1968791

Leest, B., & Wolbers, M. H. J. (2021). Critical thinking, creativity and study results as predictors of selection for and successful completion of excellence programmes in Dutch higher education institutions. *European Journal of Higher Education, 11*(1), 29-43. doi: 10.1080/21568235.2020.1850310

Livingston, L. (2010). Teaching creativity in higher education. *Arts Education Policy Review, 111*(2), 59-62. doi: 10.1080/10632910903455884

Lubart, T., Besançon, M., & Barbot, B. (2011). *EPOC: Evaluation du Potentiel Créatif*: Hogrefe.

Lubart, T. I. (2001). Models of the creative process: past, present and future. *Creativity research journal, 13*(3-4), 295-308. doi: 10.1207/S15326934CRJ1334_07

Masters, G., & Forster, M. (2010). Progression and Assessment: Developmental Assessment. In *International Encyclopedia of Education, Third Edition* (Vol. 3, pp. 369-377): Elsevier Science.

Pi, Z., Hong, J., & Hu, W. (2019). Interaction of the originality of peers' ideas and students' openness to experience in predicting creativity in online collaborative groups. *British Journal of Educational Technology, 50*(4), 1801-1814. doi: 10.1111/bjet.12671

Runco, M. A. (2009). Parsimonious creativity and its measurement. *Measuring creativity*, 393.

Tognolini, J. (2018). *Assessing skills and measuring performance of students on skills that are aligned with the needs of the 21st Century: A practical example.* Paper presented at the Proceedings of the UR International Conference on Educational Sciences (pp. 1-10).

Tognolini, J., & Davidson, M. (2012). Assessment, standards-referencing and standard setting. In *Self-directed Learning Oriented Assessments in the Asia-Pacific* (Vol. 18, pp. 23-41): Springer, Dordrecht.

Torrance, E. P., & Ball, O. E. (1984). *Torrance Tests of Creative Thinking: Revised manual*. Scholastic testing service, Bensenville, IL.

Tsai, K. C. (2013). Facilitating creativity in adult learners through brainstorming and play. *Higher Education of Social Science*, 4(3), 1-8. doi: 10.3968/j.hess.1927024020130403.3153

Wallas, G. (1926). *The art of thought* (Vol. 10). Harcourt, Brace.

Wilson, M., & Scalise, K. (2006). Assessment to improve learning in higher education: The BEAR Assessment System. *Higher Education*, 52(4), 635-663. doi. 10.1007/s10734-004-7263-y