Digital Storytelling

Digital storytelling apps offer a wide range of tools and resources for creating unique and original stories. From creating custom characters and scenarios to incorporating visual effects and sound, these apps inspire users to think outside the box and explore their creativity to its fullest.

▎ 1. Introduction

There are different meanings associated with the creativity construct. According to Walia [1], the previous literature has intertwined the concepts of creation and creativity. Consequently, scholars have not given sufficient attention to the active process of the creative act that may end in creation or not.

Neuroscience has revealed that creativity is a complex process involving the intervention of various brain areas [2]. Additionally, there are various variables within this process, with the dimension of originality being one of its components. Weisberg et al. [3] align with Walia [1] in suggesting that the diverse conceptions of creativity have been founded on models of creativity built on logical and semantic argumentation. Weisberg et al. [3] verified this generally, emphasising the importance of novelty and intentionality in creativity judgments.

Humphrey [4] and Mendoza [5] asserted that mental capacity has predominantly been approached from an individualist and cognitivist point of view.

Moreover, the neuroscience research of Stephens et al. [6] revealed that when someone sees or listens to a story, the neurons in the brain are activated with the same patterns as those of the speaker. This process is referred to as neural coupling or mirroring, occurring in different parts of the brain. It facilitates the sharing of a contextual model of the situation, involving the frontal, motor, and sensorial cortices in the process of creating and understanding stories. The brain anticipates the story´s resolution with dopamine, aiding in the precise memory of certain details. Regarding the cultural impact of storytelling, Boris [7] added the following:

> storytelling forges connections among people, and between people and ideas. Stories convey the culture. When it comes to our countries, our communities, and our families, we understand intuitively that the stories we hold in common are an important part of the ties that bind.
>
> (p. 1)

Furthermore, Shao et al. [8] explained that creativity is a complex and culture-sensitive concept, with differences observed between Eastern and Western cultures. Firstly, they possess dissimilar implicit and/or explicit conceptions of creativity. Secondly, individuals from individualist and collectivist cultures show variances in their preferred creative procedures and creative processing modes.

However, another more social and cultural perspective reveals the role of the mind in people's interactions, suggesting that intellect is a collective occurrence within interactions. Perhaps this model is more suitable for understanding the co-creation of stories and how DTS conditions this process, as the cognitive processes targeted by these apps are organised with respect to the functions for storytelling.

Vygotsky [9] underscored the correlation between imagination and creativity in childhood. Navarro et al. [10] and Kozbelt et al. [11] supported the idea that creativity unfolds over time, influenced by social interaction and the environment. Weinstein and Preiss [12] concluded that working on students' thinking skills through the use of a scaffolding technique increased their confidence and autonomy of thought.

Kampylis et al. [13] presented a study on first-year education students using the Teachers' Conceptions of Creativity Questionnaire (TCCQ). They emphasised that creativity is a crucial element for individual and social development. In addition, the authors conducted a comprehensive review of earlier studies by other researchers on the perception of creativity. Cachia and Ferrari [14] conducted a comprehensive study on creativity in European ICT teachers. According to the findings, creativity seems to be the ability to create an original product.

2. Creation of Original Stories

Pavlik [15] demonstrated in her research on structural imagination that inventive thought is governed by abstract apprehension and constructions. She concluded that representational knowledge influences the meaning and originality of the story. Thus, significant and innovative stories seem to enhance nonfigurative insights more than those that do not. Furthermore, significant correlations were established between creating meaningful vs. nonmeaningful narratives and using meaningful vs. nonmeaningful knowledge sets.

Csikszentmihalyi and Getzels [16] found a positive interaction between discovery-oriented behaviour in the creative problem origination phase and the originality of the creative product but not the craft. According to Sap et al. [17], based on neurolinguistics programming, imaginary stories have an essentially more linear storyline flow than remembered narratives, in which contiguous enunciations are more detached. If possible, remembered stories depend on more on first-person facts founded on episodic memory, just as illusory narratives bring to light more common-sense knowledge based on semantic memory.

Antonsen [18] stated that in interactive works of fiction, such as video games, journey books, and role-playing games, consumers acquire the point of view and the role of the protagonist and immerse themselves in the story. Furthermore, they require imagining themselves to be another person and imagining parts of the story while keeping in mind that they are located in the projected place. Larsen [19] researched divergent thinking, concluding that children produce original ideas after time off-task.

Weisberg [20] studied problem solving along with intuition or revelation. The participation of the memory in the aid of intuition to solve a problem depends on the specific problem. Steffensen and Vallée Tourangeau [21] stated that the problem of intuition is also believed to undergo different phases. More of these phases would depend more on working memory. Vallée Tourangeau and Vallée Tourangeau [22] explained that problem solving is part of higher cognition: thought uses communicating procedures based on a widespread assortment of external stratagems covering multiple time scales. For this reason, they recommended adopting an interactivist perspective to describe how these stratagems are dynamically shaped in time and space.

3. Digital Storytelling (DST)

Djonov et al. [23] studied the use of digital multimedia formats combined with analogue materials, revealing that preschool-age children are aware of the possibilities of the media and the semantic models in the narrative shown transmedially. Simultaneously, older children demonstrate a comprehension of story procedures and the ability to construct various social issues by choosing the most suitable semiotic stratagems accessible in the selected media. Therefore, LEGO animation, comic strips, as well as programs like Stop Motion or Garageband can assist in establishing a toddler's multimedia authorship. There are DST-type apps that are applied to language or teaching other disciplines, such as the one proposed by Dietz et al. [24] called StoryCoder: an application designed to teach computational thinking notions via storytelling in a voice-guided application for infants.

The validated test by Moral et al. [25] considers six aspects of the creativity potential of video game apps: flexibility, originality, fluidity, problem solving, product development, and, finally, copublishing and dissemination capacity. According to the study by Del Moral et al. [26], (DST) is an inventive story exercise based on the construction of multimodal narratives, with the feeling of emotion through colour [27]. This approach promotes both communicative [28] and digital skills.

Yoon [29] discovered positive attitude changes in second language (L2) learning with a deeper understanding of the content and greater participation. Digital storytelling engaged learners in the story´s content, fostering motivation, interest, and confidence to learn another language. Ya-Ting and Wan-Chi [30] concluded that DST increased students' understanding of the content to be studied, their willingness to inquire, and their ability to reflect critically. However, Hava [31] did not emphasise motivation. Additionally, there were improvements in self-confidence and students´ subjective use

after the storytelling activity, demonstrating DST as a suitable tool for learning environments to develop linguistic and digital competence.

Liu et al. [32] conducted a study with DTS in primary education. Two digital storytelling performance indicators, stages of language usage and planes of inventiveness, were established to have noteworthy but diverse influences on language learning. On the one hand, learners' achievement in the use of language in digital storytelling was significantly associated with their performance. In contrast, creativity performance was meaningfully linked to numerous elements of motivation: elaboration, task value, and extrinsic motivation. Additionally, the proposed method had a positive effect on schoolchildren's linguistic performance, contributing to increasing student motivation in two ways: orientation and extrinsic goal setting.

Liang [33] suggested multimodal narrative discourse analysis (MNDA) with allied pedagogic and investigative means to instruct and inquire into narrative. The intervention demonstrated appropriate practice of story elements, discursive arrangements, and formal strategies, as well as the physical, visual, and video resources used. All these elements helped learners develop multimodal designs and narrative styles.

Pereira and Campos [34], in terms of empathy framed in the pedagogy of multiliteracies, focus more on cognitive abilities. They investigated a case focusing on an animated narrative with hybrid multimodal text. Through the narrative on a public digital platform, students learned about refugees. The participants positioned themselves in three very different positions: as detached viewers of the characters embodied, as observers of the distress of others, or as social performers. Lawrence and Mathis [35] designed an intervention to assess learners multimodally by asking them to create multimodal portfolios. Four at-risk students were observed and interviewed, and their artifacts were evaluated. It was concluded that they were meaning generators capable of critical participation in multimodal thinking and communication.

According to Ivone [36], digital tools can greatly facilitate the process of story creation by students. Many dimensions are enhanced, including originality. She highlighted several tools, including Storybird, which allow the creation of different formats. Families can also be involved in the process. Most importantly, it allows for more autonomous creation, whereas Scratch may require more assistance.

Del Moral et al. [37] analysed a sample of 20 apps of various kinds, including Storybird, using the quantitative questionnaire CREAPP K6-12,. The results regarding originality were significant from the bottom up in terms of favouring the representation of unpublished facts in the stories, encouraging curiosity and inquiry, and involving the customer in the construction of emotional plots.

References

1. Walia, C. A Dynamic Definition of Creativity. Creat. Res. J. 2019, 31, 237–247.

2. Durante, D.; Dunson, D.B. Bayesian Inference and Testing of Group Differences in Brain Networks. Bayesian Anal. 2018, 13, 29–58.

3. Weisberg, R.; Pichot, N.; Bonetto, E.; Pavani, J.B.; Arciszewski, T.; Bonnardel, N. From Explicit to Implicit Theories of Creativity and Back: The Relevance of Naive Criteria in Defining Creativity. J. Creat. Behav. 2021, 55, 839–856.

4. Humphrey, N. Una Historia de la Mente; Gedisa: Barcelona, Spain, 1992.

5. Mendoza García, J. Otra idea de mente social. Lenguaje, pensamiento y memoria. Polis 2017, 3, 13–46.

6. Stephens, G.J.; Silbert, L.J.; Hasson, U. Speaker-listener neural coupling underlies successful communication. Proc. Natl. Acad. Sci. USA 2010, 107, 14425–14430.

7. Boris, V. What Makes Storytelling so Effective for Learning. Harvard Business Learning. Available online: https://www.harvardbusiness.org/what-makes-storytelling-so-effective-for-learning/ (accessed on 21 June 2023).

8. Shao, Y.; Zhang, C.; Zhou, J.; Gu, T.; Yuan, Y. How does culture shape creativity? A mini-review. Front. Psychol. 2019, 10, 1219.

9. Vygotsky, L.S. Imagination and Creativity in Childhood. J. Russ. East Eur. Psychol. 2004, 12, 7–97.

10. Navarro, C.; Mateos, C.; Rodriguez, M. Cultural Scenes, the creative class and development in Spanish municipalities. Eur. Urban Cult. Stud. 2012, 21, 301–317.

11. Kozbelt, A.; Beghetto, R.A.; Runco, M.A. Theories of Creativity. In The Cambridge Handbook of Creativity; Kaufman, J.C., Sternberg, R.J., Eds.; Cambridge University Press: Cambridge, UK, 2010; pp. 20–47.

12. Weinstein, S.; Preiss, D. Scaffolding to Promote Critical Thinking and Learner Autonomy among Pre-Service Education Students. J. Educ. Train. 2017, 4, 69–87.

13. Kampylis, P.; Berki, E.; Saariluoma, P. In-service and prospective teachers' conceptions of creativity. Think. Skills Creat. 2009, 4, 15–29.

14. Cachia, R.; Ferrari, A. Creativity in Schools: A Survey of Teachers in Europe; Publications Office of the European Union: Luxembourg, 2010.

15. Pavlik, L. Structured Imagination in Story Creation. J. Creat. Behav. 1997, 31, 180–200.

16. Csikszentmihalyi, M.; Getzels, J.W. Discovery-Oriented Behavior and the Originality of Creative Products: A Study with Artists. In The Systems Model of Creativity; Csikszentmihalyi, M., Ed.; Springer: Dordrecht, The Netherlands, 2014; pp. 1–10.

17. Sap, M.; Horvitz, E.; Choi, Y.J.; Smith, N.A.; Pennebaker, J.W. Recollection versus Imagination: Exploring Human Memory and Cognition via Neural Language Models. In Proceedings of the 58th Annual Meeting of the Association for Computational Linguistics, Online, 5–10 July 2020; pp. 1970–1978.

18. Antonsen, P.F. Self-Location in Interactive Fiction. Br. J. Aesthet. 2021, 61, 41–51.

19. Larsen, J.A. Measuring child-level originality through the strategic use of incubation periods during divergent thinking assessment. Think. Ski. Creat. 2022, 46, 101147.

20. Weisberg, O.R. Insight, problem solving, and creativity: An integration of findings. In Insight: On the Origins of New Ideas; Vallée Tourangeau, F., Ed.; Routledge: London, UK, 2018; pp. 191–215.

21. Steffensen, S.V.; Vallée Tourangeau, F. An ecological perspective on insight problem solving. In Insight. Sobre el Origen de las Nuevas Ideas; Vallée Tourangeau, F., Ed.; Routledge: London, UK, 2018; pp. 180–199.

22. Vallée Tourangeau, F.; Vallée Tourangeau, G. Mapping systemic resources in problem solving. New Ideas Psychol. 2020, 59, 100812.

23. Djonov, E.; Tseng, C.I.; Lim, F.V. Children's experiences with a transmedia narrative: Insights for promoting critical multimodal literacy in the digital age. Discourse Context Media 2021, 43, 100493.

24. Dietz, G.; Le, J.K.; Tamer, N.; Han, J.; Gweon, H.; Murnane, E.L.; Landay, J.A. StoryCoder: Teaching Computational Thinking Concepts through Storytelling in a Voice-Guided App for Children. In Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems, Online, 8–13 May 2021; pp. 1–15.

25. Del Moral Pérez, M.E.; Bellver, M.C.; Guzmán, A.P. CREAPP K6-12: Instrumento para evaluar la potencialidad creativa de la aplicación orientada al diseño de relatos digitales personales. Rev. Educ. Digit. 2018, 33, 284–305.

26. Del Moral Pérez, M.E.; Villalustre-Martínez, L.; Neira-Piñeiro, M.R. Teachers' perception about the contribution of collaborative creation of digital storytelling to the communicative and digital competence in primary education schoolchildren. Comput. Assist. Lang. Learn. 2019, 32, 342–365.

27. Yussof, R.L.; Abas, H.; Paris, T.N.S.T. Affective engineering of background colour in digital storytelling for remedial students. Procedia-Soc. Behav. Sci. 2012, 68, 202–212.

28. Kocaman-Karoglu, A. Personal voices in higher education: A digital storytelling experience for pre-service teachers. Educ. Inf. Technol. 2016, 21, 1153–1168.

29. Yoon, T. Are you digitized? Ways to provide motivation for ELLs using digital storytelling. Int. J. Res. Stud. Educ. Technol. 2013, 2, 25–34.

30. Ya-Ting, C.Y.; Wan-Chi, I.W. Digital storytelling for enhancing student academic achievement, critical thinking, and learning motivation: A year-long experimental study. Comput. Educ. 2012, 59, 339–352.

31. Hava, K. Exploring the role of digital storytelling in student motivation and satisfaction in EFL education. Comput. Assist. Lang. Learn. 2019, 34, 958–978.

32. Liu, K.P.; Tai, S.J.D.; Liu, C.C. Enhancing language learning through creation: The effect of digital storytelling on student learning motivation and performance in a school English course. Educ. Technol. Res. Dev. 2018, 66, 913–935.

33. Liang, M.Y. Beyond elocution: Multimodal narrative discourse analysis of L2 storytelling. ReCALL 2019, 31, 56–74.

34. Pires Pereira, I.S.; Campos, A. Constructing the pedagogy of multiliteracies. The role of focalisation in the development of critical analysis of multimodal narratives. Lang. Educ. 2023, 37, 105–122.

35. Lawrence, W.J.; Mathis, J.B. Multimodal assessments: Affording children labeled 'at-risk' expressive and receptive opportunities in the area of literacy. Lang. Educ. 2020, 34, 135–152.

36. Ivone, M.F.; Jacobs, G.M.; Santosa, M.H. Information and communication technology to help students create their own books the dialogic way. Beyond Words 2020, 8, 78–91.

37. Del Moral Pérez, M.E.; Bellver, M.C.; Guzmán Duque, A.P. Evaluación de la potencialidad creativa de aplicaciones móviles creadoras de relatos digitales para Educación Primaria. Ocnos 2019, 18, 7–20.