The Power of Digital Storytelling: Students' Perceptions about Its Utilization in Developing Practical Understanding in an Instructional Technology Context

Nader S. Shemy

***Abstract*—Dependence on technological concepts and applications to improve learning outcomes and learners' performance has broad positive effects on deepening students' understanding, especially in higher education and postgraduate studies. Digital storytelling (DST) is a high-value-added tool for achieving many learning goals. This study aims to explore students' perceptions about the use of DST in strengthening the understanding of practical concepts among students on a master's program in instructional technology at the Arab Open University in Oman. Both quantitative and qualitative methods were used to gather the required data. A total of 67 students participated in the study through a questionnaire, and a semi-structured personal interview format was used to gather qualitative data from ten of these participants. The results indicated that the students used DST for the purpose of learning and deep understanding of some practical concepts in an effective, fun, useful and constructive way in order to achieve targeted learning. The students' most positive perception was of the technique when used in the following categories: information stability, application of concepts in a variety of contexts, and problem-solving skill development (M = 4.186, SD = 0.7371; M = 4.051, SD = 0.7558; and M = 4.023, SD = 0.7531 respectively). At the same time, the students' perception was the least positive for DST in the analysis and discussion categories (M = 2.056, SD = 1.209). Most of the participants supported the idea that DST was a perfect and enjoyable tool for learning and deep understanding in their specialization. They also agreed that DST helped them to fix what they had learned and helped them to achieve broad interaction with the content and that it also contributed effectively to the application of the concepts in various learning contexts. DST developed students' ability to solve any instructional problems but mainly contributed to raising the motivation toward learning.**

***Index Terms*—Digital storytelling, instructional technology, practical understanding, e-content, e-learning**

I. Introduction

Digital storytelling (DST) is one of the most essential e-learning tools widely used in the field of teaching and learning at all educational stages, including higher education and postgraduate level. DST aims to provide interactive content to students, as it encourages them to interact with the knowledge and skills of this content. This interaction results in the development of many skills, the most important of which are deep understanding, critical thinking, and raising the academic achievement level among students [1].

DST can be defined as a type of multimedia approach that combines a variety of digital elements into a narrative structure (story). The media may include text, images, video, audio, animation, and interactive elements. It can be made available and shared to beneficiaries through social networks [2].

The advantage of DST is that it encourages students to imagine and create new knowledge through critical thinking, and it contributes effectively to supporting an understanding of many complex concepts, whether theoretical or practical. Consequently, many teachers rely on DST to provide their students with knowledge and skills, and it helps teachers to increase students' motivation and confidence toward learning [3]

As is well known, the narrator plays the main role in DST, and the narration is also the most important factor in the success of DST in achieving its goals. During the Covid-19 pandemic, many teachers sought to invite guest speakers to share their experiences and practical approaches with students by talking about their success stories, and graduates were also involved in transferring their experiences to current students. This form of DST has greatly contributed to bridging the gap between theory and practice in many academic courses [4].

With the introduction of multifunctional and low-cost digital devices, such as smartphones that capture high-quality video, DST has become increasingly popular. Stories are usually 2 to 10 minutes in length [5], and told through a combination of sound, stills, animation, music, etc. [6]. DST is often created by individuals who are not experts in professional multimedia production, relying on the use of digital cameras, smartphones, and free video editing software on computers or mobile devices [7]. The upside is that the equipment and software used are relatively low cost, allowing teachers and students the ability to create digital stories [8].

The ease of producing stories has contributed to encouraging many teachers to use DST in teaching practical concepts that are difficult to teach to students for various reasons. The most important aspect which can be supported is practicing practical concepts which cannot be taught in a hand-on way due to a lack of an appropriate environment, such as e-marketing skills. The field of instructional technology includes many practical concepts that need educational content to be provided in a different style. This is problematic for students on the master's program in instructional technology at the Arab Open University, as teachers face many challenges in providing students with a lot of the necessary practical skills, given that they are part-time students, and acquisition of these skills relies on a style different of content from the traditional style. They need to be provided with targeted skills using an in-depth approach and

Manuscript received April 7, 2023; revised May 25, 2023; accepted July 5, 2023.

Nader S. Shemy is with Instructional Technology Department, Faculty of Education, Fayoum University, Egypt. E-mail: nshemy@aou.edu.om (N.S.S.)

doi: 10.18178/ijiet.2023.13.9.1947

involving critical thinking, analysis, and discussion.

Regarding the abovementioned issue, many studies have indicated the importance of DST in raising learners' motivation and increasing their achievement and other skills. Consequently, the main research question in this paper is as follows:

What are the students' perceptions about utilizing digital storytelling in developing a practical understanding of the instructional technology context?

II. Literature Review

Gürsoy's [9] study aimed to indicate the wide impact of DST on 21st-century skills from the point of view of pre-service teachers. The results of the study indicated that DST was beneficial because it provided meaningful and lasting education and was fun and motivating. A study by Austen and Pickering *et al.* [10] explores the experiences of students in a higher education institution in the United Kingdom. Students indicated that digital storytelling provides them with an effective means of conveying these experiences. Teachers of these students indicated that there was a clear increase in the depth of students' ideas, and also a significant increase in their academic achievement.

In another study, Tanrıkulu [11] surveyed students in relation to the use of DST, and the students confirmed that their ability to apply the content of DST in their educational practices increased significantly, and the technique also led to increased opportunities for cooperation and participation among peers for a greater understanding of the targeted educational content, this is not available in the usual forms of instruction. Chen and Chuang [12] point out that the use of DST greatly enhances students' retrieval of any knowledge contained, as they confirmed that students' interaction with the content of DST helps them retrieve knowledge easily and in a detailed way.

In terms of the specific features of DST, there are sets of factors introduced by experts who guide digital storytellers during the construction process. The main factors are given here [13]: (a) Point of View: The main point of the story from the author's perspective; (b) A Dramatic Question: The question that keeps the beneficiaries' attention and will be answered by the story events; (c) Emotional Content: Deep issues feel real to keep beneficiaries connected with the story; (d) The Voice: A style to help the beneficiaries understand the story context; (e) The Soundtrack: The music or other sounds that support the story context; (f) Economy: Effective utilization of the components of the story without overloading that may negatively affect the beneficiaries; (g) Pacing: Maintaining a balanced rate for the story's pace.

The results of Çetin's [14] study highlighted the positive role of planning digital storytelling, as it became clear that the digital literacy skills of pre-service teachers had developed significantly, and the results indicated the contribution of DST in the development of personal, technical, and professional skills. The results also highlighted the need to use digital novels in the education sector.

A study by Nicoli and Henriksen *et al.* [15] indicated that there is more than one form of DST, which varies according to the visual content of the digital story itself; some of these are linear, non-linear, and mixed. Each of these forms has the appropriate context for its engagement in education.

DST provides students with many 21st-century skills, such as critical thinking, writing, projection, problem-solving, and decision-making. Nicolaou [16] emphasizes the importance of DST in developing the skill of hypothesis projection, which is the ability to identify appropriate hypotheses as a preliminary solution to any problem, deductive skills, explanatory skills, and the ability to understand and express the meaning and importance of many available facts, or to express reasons, or draw some conclusions from the available facts.

DST allows for sharing and interaction between students and teachers, and among peers, as supported by Chen and Liu *et al.* [17] who indicated that DST provides students with many social skills, through discussion and dialogue between them, the work of collaborative groups, and working together as a team. DST is characterized by its appeal to students' attention through narration with audio-visual effects, which students find engaging and which raises their motivation for achievement. This was confirmed by Göksün and Gürsoy [18] who pointed out that the most important thing that differentiates DST from other methods is that it is a powerful tool for creating more participation in exciting learning environments, as well as that it contains animated images in attractive colors and multiple characters in addition to the sounds effects used for the stories. Therefore, DST offers an ongoing opportunity to achieve the target outcome in the best possible way.

III. Research Methodology and Procedures

A. Research Methods

Qualitative and quantitative methods were chosen for the purposes of this study. They were considered appropriate for measuring the students' perceptions about utilizing DST in developing practical understanding in an instructional technology context. The research was undertaken at the Arab Open University (AOU) in Oman with students on the master's program in instructional technology throughout the fall semester of the academic year 2022/2023.

B. Research Sample

There was a total of 67 participants from AOU. They were specializing in instructional technology at a master's degree level. Their ages ranged from 26 to 38, and all of them were acquainted with using DST for learning and practice. A total of 10 students were chosen randomly from the group of 67 to participate in a semi-structured interview.

C. Research Instruments

For the purposes of the current study, the researcher used a questionnaire and semi-structured interviews.

First: the researcher prepared the questionnaire after reviewing the relevant literature, based on DST features; the main objective was to gather participants' feedback on the usage of DST for the learning of instructional technology concepts, so a 22-item was prepared and displayed in the

following 8 categories: applying the concepts in a variety of contexts, solving related problems, analysis, and discussion, linking concepts to reality, interacting with e-content, re-using, information steadfastness, and increased motivation. All items were based on a 5-point Likert scale for the quantitative method. To determine the validity and reliability of the questionnaire, it was administered to a psychometric sample consisting of 12 students, who were not from the main research sample. The data obtained from the psychometric sample were uploaded to SPSS, then the validity and reliability were assessed. The results demonstrated that Cronbach's Alpha for the quantitative items was 0.899, which conveyed that the questionnaire was reliable and reasonable for research.

The Exploratory Factor Analysis (EFA) was conducted using the basic components method, it was found from the Table I that there are eight latent factors produced by the exploratory factor analysis of the questionnaire, around which the items that make up the survey are organized, and that these factors attracted (99.97%) of the correlational variance of the correlation matrix, where each worker acquired the following ratio:

TABLE I: THE RESULTS OF THE EXPLORATORY FACTOR ANALYSIS OF THE QUESTIONNAIRE

Component	Factor	of Variance %
1	Applying the concepts in a variety of contexts	9.09
2	Solving related problems	13.63
3	Analysis, and discussion	9.09
4	Linking concepts to reality	13.63
5	Interacting with e-content	13.63
6	Re-using	9.09
7	Information steadfastness	13.63
8	Increased motivation	18.18

Then, the saturation matrix on the items was extracted, and the Table II shows this:

TABLE II: THE QUESTIONNAIRE'S ITEMS AND ITS FACTOR SATURATION

I	F1	F2	F3	F4	F5	F6	F7	F8
1	-	-	0.79	-	-	-	-	-
2	-	-	-	0.63	-	-	-	-
3	-	0.78	-	-	-	-	-	-
4	0.83	-	-	-	-	-	-	-
5	-	-	-	0.85	-	-	-	-
6	-	-	-	-	0.85	-	-	-
7	-	0.89	-	-	-	-	-	-
8	-	-	-	-	-	0.90	-	-
9	-	-	-	-	-	-	-	0.69
10	-	-	0.86	-	-	-	-	-
11	-	-	-	-	0.80	-	-	-
12	-	-	-	-	-	-	0.79	-
13	0.91	-	-	-	-	-	-	-
14	-	-	-	-	-	-	-	0.75
15	-	-	-	0.79	-	-	-	-
16	-	-	-	-	-	-	-	0.78
17	-	-	-	-	-	-	0.87	-
18	-	0.85	-	-	-	-	-	-
19	-	-	-	-	-	0.83	-	-
20	-	-	-	-	-	-	-	0.89
21	-	-	-	-	-	-	0.84	-
22	-	-	-	-	0.78	-	-	-

It is clear from the previous table that the eight latent factors and the saturation of the items on the factors, as all of them were higher than 0.3. The first factor has been saturated with two items, which are (4, 13), the second factor has saturated three items, which are (3, 7, 18), the third factor has saturated two items, which are (1, 10), and the fourth factor has saturated three items, which are (2, 5), 15), and the fifth factor was saturated with three items, which are (6, 11, 22), and the sixth factor was saturated with two items, which are (8, 19), and the seventh factor was saturated with three items, which are (12, 17, 21), and finally the eighth factor was saturated with it four items, namely (9, 14, 16, 20).

Additionally, the questionnaire was reviewed for accuracy by various experts in instructional technology and measurement, and certain linguistic modifications were made based on the opinions of the experts.

Second: the researcher prepared the semi-structured interviews with 10 randomly selected students from among the sample who had expressed a willingness to be interviewed. The purpose of these interviews was to reach a fuller understanding of the students impressions of the added value of DST in facilitating a deep understanding of practical instructional technology concepts. Most of the interview questions were unrestricted, in order to ensure the largest number of impressions could be acquired from the sample. The questions were reviewed by various experts in the field of instructional technology, and there was consensus among them that they were comprehensive and accurate questions for the target responses.

D. Data Collection

Approval was obtained from the administration of the AOU in Oman to undertake the research with students on the master's program in instructional technology, throughout the fall semester of the academic year 2022/2023. A meeting was held with the sample in order to clarify the purpose of the research in an accurate manner. Then, the questionnaire was sent to all participants via Google forms, and 67 responses were returned. The personal interviews took place on the university campus, face-to-face for 7 participants, while 3 participants were interviewed online through the TEAMS program because certain circumstances prevented them from

meeting on the university campus. To increase the accuracy of the results of the interviews, the sample was allowed to review the researcher's responses below. Several other interviews followed the first interview to make sure of the accurate outcome of the sample interviews. Finally, the data gathered from the questionnaire results were processed using SPSS software.

IV. Research Results

A. Results from the Questionnaires

The results of the data analysis for the frequency of DST use for learning and deep understanding among students were displayed according to categories: applying the concepts in a variety of contexts, solving related problems, analysis, and discussion, linking concepts to reality, interacting with e-content, re-using, information steadfastness, and increased motivation. The frequency was ranked as 1 for never, 2 for seldom, 3 for sometimes, 4 for often, and 5 for always.

A 5-point Likert scale mentioned before, was used for data collection. The results in Table III proved that, in general, students considered DST to be quite positive for their learning and deep understanding of instructional technology concepts. To be specific, students confirmed that DST was most useful for the following categories: information steadfastness, applying the concepts in a variety of contexts, and solving related problems. Their satisfaction with these categories was recorded as high (M = 4.186, SD = 0.7371; M = 4.051, SD = 0.7558; and M = 4.023, SD = 0.7531 respectively). In contrast, students did not indicate that DST was particularly useful for the categories analysis and discussion (M = 2.056, SD = 1.209) since they were dissatisfied with DST in these contexts. As for the categories: link concepts to reality, increased motivation, re-using, and interacting with e-content, students felt that those categories were areas for which DST was useful with rates that varied from (M = 3.546, SD = 0.7780) to (M = 3.288, SD = 0.6692).

TABLE III: Students' Responses on the Use of DST And Its Impact

Category	N	Mean	SD
Applying the concepts in a variety of contexts	67	4.051	0.7558
Solving related problems	67	4.023	0.7531
Analysis and discussion	67	2.056	1.209
Linking concepts to reality	67	3.546	0.7780
Interacting with e-content	67	3.288	0.6692
Re-using	67	3.506	0.7433
Information steadfastness	67	4.186	0.7371
Increased motivation	67	3.525	0.8299

B. Results from the Interviews

From the analysis of the interviews, 90% of the participants supported the assertion that DST was a perfect and enjoyable tool for learning and deep understanding in their specialization. Students preferred a tool that links them with reality and is familiar to them, when studying to acquire a deep understanding of practical concepts in the field of instructional technology.

Digital storytelling taught me the value of emotional responses to learn about others, increased my cultural understanding, and [helped me] to find empathy and encouraged me to pursue topics I'm passionate about. Also, [DST helped] to retell a historical event or reflect on a personal experience. (Participant 17)

In addition, 8 out of 10 students agreed that digital storytelling helped them to fix what they had learned and remember all the practical concepts for longer due to their interaction with the events of the story and the characters included in it.

I found digital storytelling steadfastness, as in my opinion it is the practice of using computer-based tool to tell stories in an interactive way; it contains a mix of recorded audio, computer-based images, video clips, text and music to explain a concept or to make an argument, which increases my enthusiasm and motivation. (Participant 9)

A total of 70% of the participants recognized that DST helps them to a wide interaction that takes place with the content it contains, which puts them in a focused state of mind and helps with understanding, and drawing conclusions about what is intended by storytelling, since the participants felt they could stay on the right track to achieve great results for learning improvement.

When the teacher includes interactive elements as maps, social media, and multimedia, this helped me to optimize all elements to the story and bring narratives to life. (Participant 33)

Interestingly, 90% of the participants described DST as a basic reference for them that could be referred to and reused more than once, whether to ensure their understanding of certain concepts or to periodically review those concepts.

Digital storytelling is effective because it allows me and my colleagues to elicit emotional responses, share our stories of recovery in creative ways and increase our motivation and achievement. So, I am interested in reusing DST many times. (Participant 43)

On the other hand, the participants were divided about the contribution of DST in motivating them towards further analysis and discussions resulting from their interaction with the content of stories. Some indicated that their interaction with the storytelling required analysis and discussion in order to reach the target, while some indicated that the role of DST is belittled in improving their level of analysis and discussion.

Digital storytelling allows me to be engaged, motivated & aware of 21st-century literacy [information, visual, technological & media literacy]. (Participant 13)

The majority of participants indicated a great benefit of DST, namely that it contributes effectively to the application of the concepts it contains in various learning contexts, whether for the same course or for other related courses.

Applying the concepts inside digital storytelling helped to create engagement and interest for me with the context and concepts, [especially when linked to the real world]; it makes me more motivated with better understanding. (Participant 66)

There was almost consensus among the participants about the contribution of DST to developing their ability to solve any problems related to what they had learned and understood in depth from the content of this storytelling.

I can solve problems related to digital storytelling as it creates space for meaningful listening, engaging me and my colleagues in the story's message to explore new ways of thinking in a different way, as it enhances our language speaking skills. (Participant 39)

A total of 80% of the participants confirmed that DST contributed mainly to raising their motivation towards learning in general and towards learning practical concepts in instructional technology, which represents the main strength of this specialization.

When my teacher uses digital storytelling in the student-centered lessons, my motivation and engagement are increased, because it makes learning easier and improves my social skills and imagination. (Participant 53)

V. Discussion

The results of the research supported the ability of DST to improve the learning of the participants, especially their level of understanding and the depth of this understanding of concepts of a practical nature in the field of instructional technology.

The research emphasized that the DST elements, which include pictures, audio, video, animation, and audio and visual effects, were the most significant factor in terms of participants' benefit from this storytelling in improving and deepening their understanding. This is consistent with what Erdogan [19], Talan [20], Churchill [21] and Smyrnaiou and Georgakopoulou *et al.* [22] indicated. In the same context, the researcher believes that introducing practical concepts in the field of instructional technology through DST contributes effectively to understanding these concepts, especially when they are related to dramatic events from reality, with which students interact through analysis and drawing conclusions.

The results also indicated that DST was considered helpful among students to improve their mastery of learning and understanding. These results were in line with Simsek [23], Özkaya [24], Leong and Abidin *et al.* [25] and Choi [26] since students chose DST as a main tool due to its fun to interact with and its functionality.

The researcher noticed that the participants were very interactive while overseeing the DST, and there was a wide range of discussion that took place after viewing stories in order to deepen understanding and cite illustrative examples related to the concepts included in the storytelling. This mainly contributed to stabilizing the targeted knowledge and making it easier to remember it later in natural or planned life situations.

The research indicated that students have a good theoretical and practical relationship with digital tools used through the Internet. Thus, students do not really find it difficult to use and reuse DST to enhance their learning and deep understanding. This was confirmed by authors [27–29], who stated that the characteristics of the current digital generation of students contribute effectively to DST being beneficial to them in the context of learning and instruction.

In the same context, and towards making DST available in a way commensurate with the characteristics of the digital generation, Liestoel [30] points to the effectiveness of using augmented reality in designing and producing DST, as augmented reality contributes to a better image of events and characters in the story and represents a clear enrichment of the use of DST for the digital generation. Tengler and Sabitzer [31] confirm that utilizing DST in teaching robotics programming has an effective impact in developing positive attitudes among students towards learning robotics programming, in addition to learning many other skills such as thinking, narration, and reading.

In particular, the students seem to have sufficiently understood the instructional technology concepts included in DST. Overall, 80% of the students believed that digital storytelling makes the target concepts more interesting, fun, and applicable in a variety of learning contexts as well as in a variety of life contexts. Thus, students' motivation towards learning and deep understanding is positively affected, as students' motivation automatically increases after using DST.

The researcher emphasized that the sample was positive and enthusiastic in their learning, and they were cooperative with each other during learning. The researcher also noticed a clear advancement in their knowledge and skills in the context of DST and related to practical concepts in instructional technology. Where the students were quick to obtain additional information about these concepts, they were fastidious about sharing them with each other through the tools of the learning and content management system (LCMS), as well as through social networks. In general, it was clear that the students were positively affected after their experience with DST.

Finally, the researcher confirms that DST contributed greatly to the development of students' achievement, especially in terms of their level of understanding, which reached the stage of mastery. Tis was due to the fact that DST provided great opportunities for students to stabilize the target knowledge, and to develop problem-solving skills related to the events of storytelling, its ease of use and reuse, and linkage of the concepts included in the storytelling with many other related concepts, as well as linkage with the real world through the presentation of similar events.

VI. Conclusion

Considering the above findings, there were very positive perceptions among students about the use of DST in terms of deepening understanding of practical concepts in the field of instructional technology. Students felt that the following categories were best supported by DST: information steadfastness, applying the concepts in a variety of contexts, solving related problems, linking concepts to reality, increased motivation, re-using, and interacting with e-content. On the other hand, students did not consider DST to be particularly supportive of the category analysis and discussion. In general, most of the students maintained that DST was an excellent and comforting strategy for deep understanding in

the instructional technology field.

It has become essential to expand the reliance on DST to provide interactive e-content that is highly consistent with the needs of the digital generation. It is expected that presenting instructional technology concepts in this way will help students to increase their academic achievement rates, deepen their understanding, and develops many skills they need to improve their performance.

There is a serious effort to disseminate recommendations for DST to enhance students' understanding, because of its potential to attract students' attention and maximize their motivation to learn. The researcher recommends professional development to support educators to develop and use DST. If possible, students should also be trained to design and produce DST material as this would support their learning and enable them to find a way to learn that suits them. Furthermore, those responsible for planning and designing instructional technology e-content should be urged to introduce DST in delivering concepts and skills to students in their learning.

CONFLICT OF INTEREST

The author declares no conflict of interest.

REFERENCES

[1] Y. T. C. Yang, Y. C. Chen, and H. T. Hung, "Digital storytelling as an interdisciplinary project to improve students' English speaking and creative thinking," *Computer Assisted Language Learning*, vol. 35, no. 4, pp. 840–862, 2022.

[2] J. B. Ohler, *Digital Storytelling in the Classroom: New Media Pathways to Literacy, Learning, and Creativity*, Corwin Press, 2013.

[3] E. Meletiadou, "Using educational digital storytelling to enhance multilingual students' writing skills in higher education," *IAFOR Journal of Education*, vol. 10, no. 2, pp. 111–130, 2022.

[4] J. Nunvarova, P. Poulova, P. Prazak, and B. Klimova, "Effectiveness of digital storytelling in teaching economics," *Education Sciences*, vol. 13, no. 5, p. 504, 2023, doi: 10.3390/educsci13050504.

[5] Y. Anggeraini and N. Afifah, "Digital storytelling as a teaching medium in the reading classroom," *Language Circle: Journal of Language and Literature*, vol. 12, no. 1, pp. 83–90, 2017.

[6] Y. B. Choo, T. Abdullah, and A. M. Nawi, "Digital storytelling vs. Oral storytelling: An analysis of the art of telling stories now and then," *Universal Journal of Educational Research*, vol. 8, no. 5A, pp. 46–50, 2020.

[7] C. Y. Quah and K. H. Ng, "A systematic literature review on digital storytelling authoring tool in education: January 2010 to January 2020," *International Journal of Human–Computer Interaction*, vol. 38, no. 9, pp. 851–867, 2022.

[8] D. Saripudin, K. Komalasari, and D. N. Anggraini, "Value-based digital storytelling learning media to foster student character," *International Journal of Instruction*, vol. 14, no. 2, pp. 369–384, 2021.

[9] G. Gürsoy, "Digital storytelling: Developing 21st Century skills in science education," *European Journal of Educational Research*, vol. 10, no. 1, pp. 97–113, 2021.

[10] L. Austen, N. Pickering, and M. Judge, "Student reflections on the pedagogy of transitions into higher education, through digital storytelling," *Journal of Further and Higher Education*, vol. 45, no. 3, pp. 337–348, 2021.

[11] F. Tanrıkulu, "Students' perceptions about the effects of collaborative digital storytelling on writing skills," *Computer Assisted Language Learning*, vol. 35, no. 5–6, pp. 1090–1105, 2022.

[12] H. L. Chen and Y. C. Chuang, "The effects of digital storytelling games on high school students' critical thinking skills," *Journal of Computer Assisted Learning*, vol. 37, no. 1, pp. 265–274, 2021.

[13] F. Fusté-Forné, "The portrayal of Greenland: A visual analysis of its digital storytelling," *Current Issues in Tourism*, vol. 25, no. 11, pp. 1696–1701, 2022.

[14] E. Çetin, "Digital storytelling in teacher education and its effect on the digital literacy of pre-service teachers," *Thinking Skills and Creativity*, vol. 39, 100760, 2021.

[15] N. Nicoli, K. Henriksen, M. Komodromos, and D. Tsagalas, "Investigating digital storytelling for the creation of positively engaging digital content," *EuroMed Journal of Business*.

[16] C. Nicolaou, "The secret power of digital storytelling methodology: Technology-enhanced learning utilizing audiovisual educational content," *Enhancing Education through Multidisciplinary Film Teaching Methodologies*, IGI Global, pp. 235–246, 2023.

[17] Y. T. Chen, M. J. Liu, and Y. Y. Cheng, "Discovering scientific creativity with digital storytelling," *Journal of Creativity*, vol. 33, no. 1, 100041, 2023.

[18] D. O. Göksün and G. Gürsoy, "Digital storytelling in science teacher education: Evaluation of digital stories," *Science Education International*, vol. 33, no. 2, pp. 251–263, 2022.

[19] E. Erdogan, "The impact of digital storytelling on the academic achievement and democratic attitude of primary school students," *Educational Policy Analysis and Strategic Research*, vol. 16, no. 1, pp. 427–448, 2021.

[20] T. Talan, "Meta-analytic and meta-thematic analysis of digital storytelling method," *Bartın University Journal of Faculty of Education*, no. 1, pp. 18–38, 2021.

[21] N. Churchill, "Development of students' digital literacy skills through digital storytelling with mobile devices," *Educational Media International*, vol. 57, no. 3, pp. 271–284, 2020.

[22] Z. Smyrnaiou, E. Georgakopoulou, and S. Sotiriou, "Promoting a mixed-design model of scientific creativity through digital storytelling—the CCQ model for creativity," *International Journal of STEM Education*, vol. 7, no. 1, pp. 1–22, 2020.

[23] M. R. Simsek, "Towards emancipatory L2 instruction: Exploring significant learning outcomes from collaborative digital storytelling," *International Journal of Educational Methodology*, vol. 6, no. 3, pp. 555–569, 2020.

[24] P. G. Özkaya, "Investigating research trends on digital storytelling: A bibliometric and visualized analysis," *International Journal of Progressive Education*, vol. 18, no. 1, pp. 379–396, 2022.

[25] C. H. Leong, M. J. Z. Abidin, and J. Saibon, "Learners' perceptions of the impact of using digital storytelling on vocabulary learning," *Teaching English with Technology*, vol. 19, no. 4, pp. 3–26, 2019.

[26] G. Y. Choi, "Learning through digital storytelling: Exploring entertainment techniques in lecture video," *Educational Media International*, vol. 55, no. 1, pp. 49–63, 2018.

[27] N. Karantalis and D. Koukopoulos, "Utilizing digital storytelling as a tool for teaching literature through constructivist learning theory," *SN Social Sciences*, vol. 2, no. 7, pp. 1–19, 2022.

[28] C. Spaliviero, "Teaching Italian as a second language through digital storytelling: Students' perceptions towards IZI. TRAVEL," *Journal: EuroAmerican Journal of Applied Linguistics and Languages*, no. 1, pp. 91–121, 2022.

[29] N. Di Blas, "Authentic learning, creativity and collaborative digital storytelling," *Educational Technology & Society*, vol. 25, no. 2, pp. 80–104, 2022.

[30] G. Liestoel, "Augmented reality storytelling—narrative design and reconstruction of a historical event in Situ," *International Journal of Interactive Mobile Technologies (iJIM)*, vol. 13, no. 12, pp. 196–209, 2019.

[31] K. Tengler and B. Sabitzer, "Examining teachers' intention to integrate robotics-based storytelling activities in primary schools," *International Journal of Interactive Mobile Technologies (iJIM)*, vol. 16, no. 06, pp. 221–240, 2022.