

A Configurable Storytelling System for Emotion Recognition in Children: Design and Pilot Evaluation

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Abstract—Computer games are very popular among children, with serious games being widely used for teaching specific skills and rehabilitation across various age groups. This work presents a configurable, story-based serious game designed to teach emotion recognition to young children (ages 6 to 11) through a peer-assisted learning approach. The system emphasizes pedagogical adaptability, allowing educators to customize content without programming knowledge. Its core innovation lies in structuring collaboration where older children co-create emotion-focused questions and facts for younger peers, operationalizing Vygotsky's social development theory. A pilot study (N=4) demonstrated the system's effectiveness in improving emotion identification, with 75% of participants showing increased engagement with the story's emotional cues. Results indicated successful peer-assisted interaction, where younger children answered most questions posed by older peers and showed critical engagement through fact verification. The findings suggest that this configurable, peer-assisted storytelling approach offers a promising, accessible method for fostering social-emotional learning in educational settings.

Keywords—Computer gaming; serious games; education; emotions learning; peer-assisted learning

I. BACKGROUND

A. Introduction

Computer gaming is very popular among children and teenagers, and even sometimes among adults. They help with distraction and passing boring time when there are no activities to do. They sometimes distract people from doing required tasks as well. If used with moderation, they usually cause no harm other than wasting one's time. Serious gaming is a part of computer gaming used for teaching individuals specific skills, giving them knowledge, and instilling proper attitudes. Old-fashioned teaching can be boring at times. Teaching using games is more entertaining and is helpful to people of all ages, especially children. Serious games are also called applied games. It is a game used by industries like education, health care, engineering, and others for the purpose of teaching.

Digital game-based learning (DGBL) has gained traction in primary education for teaching social-emotional skills, with evidence showing improved engagement and retention compared to traditional methods [1]. However, most tools focus on solo play, neglecting the potential of peer-assisted learning—a gap our study addresses. A configurable, story-based serious game is presented where older children (ages 10 to 12) design emotion-focused questions for younger peers (ages 6 to 8), leveraging Vygotsky's social development theory

to scaffold learning. Unlike VR-based interventions (e.g., [2]), our low-cost design prioritizes accessibility for classrooms and therapists.

Young children start to learn feelings and emotions on their own. Sometimes they are difficult for them to understand. Teaching feelings and emotions to young children is not an easy task. Games can help a child to learn about feelings and emotions in a fun and engaging way. Children's books or shows also help kids learn about feelings. One can at any part of the book or show stop and ask the child how the show's character feels, and the child himself feels as well. A discussion can follow about the various feelings the character may be having and why.

The primary novelty of this work lies in its integrated design approach, which distinctively combines three key elements: 1) a fully configurable, story-based system that requires no programming expertise from educators, 2) a structured peer-assisted learning model that operationalizes Vygotsky's social development theory for emotion recognition, and 3) a low-cost, scalable implementation that prioritizes accessibility over technological immersion. This integrated approach addresses specific gaps in the existing literature, such as the high cost and complexity of VR-based tools [2] and the lack of structured, cross-age peer interaction in many solo-play serious games [1].

B. Theoretical Framework

This work builds on social constructivism by Vygotsky [3] and Social and Emotional Learning (SEL) frameworks [4] to justify peer-assisted emotion learning.

Several serious games were developed to support people's development in multiple areas, such as rehabilitation, cognitive skills, and others. An immersive virtual reality (VR) game called Seas the Day was developed by Muñoz et al. [2], and it is freely available to be played in VR headsets. This game helped people with dementia to promote their physical activities. While this demonstrates the potential of immersive technology for engagement, it also highlights a limitation in cost and accessibility, which our low-cost, PC-based design directly addresses.

A study by Yang et al. [5] evaluated the effect of video games on performance and cognitive function in older participants with respect to different functions such as balance, execution, cognitive, physical, processing speed, and fears of falling and depression. Video games helped the participants to

improve their processing speed, general cognitive function, and reduce their fear of depression.

A work by Keith et al. [6] used video games to build and enhance teamwork. Teams in the team video gaming treatment increased their productivity in tasks after the gaming practice, than other teams who did not work on the video game's team.

Sukirman et al. [7] developed a virtual reality (VR) learning game. The game combined educational content with gameplay mechanics that directly reinforce computational thinking skills for university students.

Grant and Elaheebocus [8] built a web application that helps users in wellness promotion and increased social interaction. The game was successful in achieving these things in addition to being enjoyable to play with.

Knorr and Zinn [9] worked on an online role-playing game (RPG) to help promote educators' teaching skills in the classrooms. The game addressed complex teaching concepts, with issues of inclusion and heterogeneity in the classroom.

Silva et al. [10] proposed multiplayer serious games intended for cognitive and psychosocial rehabilitation. By playing games with other people, patients with acquired brain injury develop their cognitive skills and human interaction, and get a better rehabilitation process. This underscores the value of social interaction. The suggested work extends this principle by structuring the interaction across age groups to create a specific peer-assisted learning dynamic, rather than general multiplayer gameplay.

Heng et al. [11] presented a serious role-playing game applying cognitive behavioral therapy (CBT) to treat patients with anxiety disorders. The game is mainly intended for mental health promotion. The result was a better improvement in anxiety symptoms as compared to conventional therapy.

Bjørneret al. [12] created a serious game to enhance reading engagement for students. The game included reading and storytelling of a specific novel. The results showed affirmative comments for the reading engagement and the story world.

Cameiro et al. [1] studied the positive influence of serious games to help children diagnosed with autism spectrum disorder. The games helped in improving social, attention, and behavioral skills. This confirms the utility of serious games for SEL. The proposed work's contribution is a configurable framework that allows educators to adapt the content for various needs, including but not limited to learners with neurodiversity.

The study done by Ye, L., Wang, R., and Zhao, J. [13] discusses a game mode based on a jigsaw puzzle for cultural heritage learning. A case study using a historical pattern from China examines the effectiveness of improving learning performance and motivation. The result of the experiment demonstrates that the game process based on a digital puzzle can help learners better identify and retain pattern structure and improve learning motivation better than traditional video learning.

In [14], the authors presented a serious game for teaching the concepts of sequence and iteration in programming to novice students using an adaptive model based on fuzzy logic that adjusts the support acquisition according to student knowledge level. The analysis indicated positive results and a potential solution for balancing the amount of assistance in serious games.

Another study from the same authors [15] proposed an alternative method for user support in serious games about programming, which provided improved learning efficiency.

II. INTERVENTION

A needy assessment was performed by interviewing therapists and checking previous work on the matter of learning and controlling emotions for children. It is discovered that the children need to learn self-regulation, which is the ability to understand and manage one's own behavior and reactions. [16]

In order to answer the mentioned needs, in this work, a serious game was developed to teach feelings and emotions to young children. The game involves showing pictures and a story text shown in order with questions. The game is fully configurable. You can put a story with any set of images and the related image text. Then you can add the facts and questions for the user to choose from.

A first set of images/questions/story text is implemented based on the story "The Ugly Duckling" for the kids (see Fig. 1). The game is similar to a role-playing game, but more in a storytelling manner. The game is described in detail in our previous work [17]. The game involves two groups of children, an older group and a younger group. The older group reads the story, moving through the pictures and choosing related facts and questions for each checked image. The second group will go through the same story and answer the questions posed by the first group. A therapist will register the children's interactions to the tale for both groups.



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Fig. 1. The initial story theme of the serious game.

As for the technical implementation, the game was developed as a Windows application (C#/Visual Studio), but prioritizes pedagogical adaptability; educators can modify stories/questions without programming knowledge. The game files include the main game and a "Data" folder. The "Data" folder has the "Images" folder and several files, namely:

“Faits”, “Param”, “Questions”, “SAVED”, and “Texte”. A detailed explanation of each part is as follows:

The “Images” folder contains all jpeg type pictures numbered in sequence from image1 until imageXX, where XX is the picture count.

The “Texte” file is a list of texts accompanying the images. Only one text per line is related to the corresponding picture, as shown in Table I.

TABLE I. THE STORY’S TEXT

Picture	Text
1	The Ugly Duckling
2	
3	Once upon a time
4	In a beautiful nature, duck had a different egg
5	Which gave a duckling different from all the others
6	The mother duck tried to love that duckling
7	The duckling was rejected from all and even attacked
8	
9	The ugly duckling escapes and goes alone for a long distance
10	Facing dangers without protection
11	Almost dead, but he survives
12	
13	It seems not everything was against him
14	He meets friendly geese
15	Going on his way, he finally meets swans who recognize him as one of theirs
16	They were so beautiful that he wanted to be like them
17	
18	Finally, he discovers what he really was
19	
20	Life was worth living after discovering his true fundamental nature in its difference.

The “Param” file is a general parameter file that includes the number of images and the delay between consecutive images, when in story mode.

The “Questions” file contains the list of all possible questions that can be asked for every picture, as shown in Table II.

TABLE II. THE STORY’S QUESTIONS

	Question
1.	How is the character described?
2.	What emotion does the character feel?
3.	How do the other characters feel?
4.	What is the felt emotion?
5.	How do you feel reading this story?
6.	What does interest you in this story?
7.	What do you want to talk about this story?
8.	And more specifically what interests you personally about this story?
9.	What does that make you think of?
10.	Do you like it or not?
11.	Does this remind you of anything from the past?
12.	Do you see any similarities in the present?

The “Faits” file has a list of all possible facts that can be chosen by the user for every picture, as in Table III.

TABLE III. THE STORY’S FACTS

	Fact
a.	Ugly
b.	Small
c.	Duck
d.	Very Different
e.	Rejected by everyone
f.	Don’t come near
g.	Attacked
h.	His beauty
i.	Magnificent
j.	Elegant

The “SAVED” file includes the results saved in the previous test session and will be saved at the end of the current test session. The results are open at the beginning of a session and saved at the end of that session, to be kept for later usage.

The system is fully configurable. You can put a story with any set of images and the related image text. Then you can add the facts and questions for the user to choose from, and fill the parameter file to specify the number of pictures and the delay time between each two consecutive ones in slide show.

III. METHODS

The initial story set, which is used for testing is the “Ugly Duckling”. It is a classical nineteenth-century fairy tale that tells the story of a duckling who looked different than his brothers and sisters. Because of this, the others saw him as ugly and bullied him. He ran away from home and wandered alone through the fall and winter, and suffered from the bad weather and feared other animals. He felt lonely and sad. When the spring came, he met with a group of swans and realized that he had become a beautiful swan. This ended his misery.

This initial story includes twenty images with different text, facts, and questions (see Fig. 2). All of them are initially in French language because the system was created to be applied in a French institution first. However, the system can easily be adapted to other languages, such as English and Romanian (our next planned study). Each picture has an accompanying text. Given the images in series with their descriptions, the child can choose facts and questions related to each image.

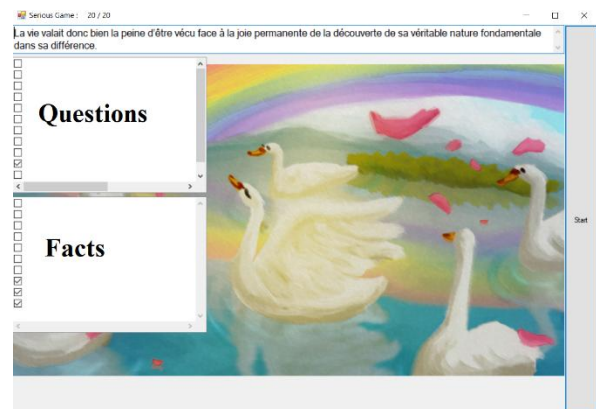


Fig. 2. Game page showing questions and facts sections.

A. Technical Implementation of the Serious Game

The application was developed as a Windows desktop program using C#/.NET with a configurable, story-based interface. Key components include:

1) User Interface (UI) Design

- Main Window: Displays story images in a PictureBox (1152×763 pixels, zoom-to-fit) and a Start button to initiate the slideshow.
- Navigation: Users click the PictureBox to manually advance images or use the Start button for automated progression (planned feature via Timer).

2) Data storage and configurability

The game supports educator customization through a file-based system in a Data folder:

- Images: Stored as image1.jpg, image2.jpg, etc.
- Text & Metadata:
 - Texte: Plaintext file mapping each image to story text (line 1 → image1.jpg).
 - Questions/Faits: Lists of questions and facts per image.
 - Param: Controls image count and slideshow delay.
- Session Data: SAVED logs user responses for therapist review.

3) Workflow

a) Older Children (Content Creation):

- Select questions/facts for each image via UI; choices saved to Questions/Faits.

b) Younger Children (Application):

- View slideshow, answer questions, and validate facts; responses recorded in SAVED.

4) Technical Advantages

- Low-Cost: Runs on standard PCs; no VR/cloud dependencies.
- Adaptability: Educators modify content by editing files (no coding required).
- Scalability: Supports multiple stories by swapping Data folders.

An overall system's architecture is shown in the following Fig. 3.

B. Pilot Study Detail

This is a feasibility pilot study with a small N to test the system's functionality and user engagement, not to draw broad statistical conclusions. The game employs a two-phase framework grounded in collaborative learning:

- Content Creation: Older children (N=2, ages 11–12) select emotion-focused questions/facts for each story image (e.g., “How does the character feel?”), fostering metacognition.
- Application: Younger children (N=2, ages 7–8) answer questions, with therapists recording responses to assess emotion recognition accuracy (see Table IV to Table VIII).

There are two sets of tester children. The first set browses the pictures and chooses the questions and facts related to each picture. When a user finishes working on one picture, he moves to the next picture by clicking the left mouse button. On the other hand, if he wants to cancel his choices he clicks the right mouse button to go back to the previous slide and cancel his updates. When all the pictures are done, he can test the work by running the slideshow using the “START” button (see Fig. 4).

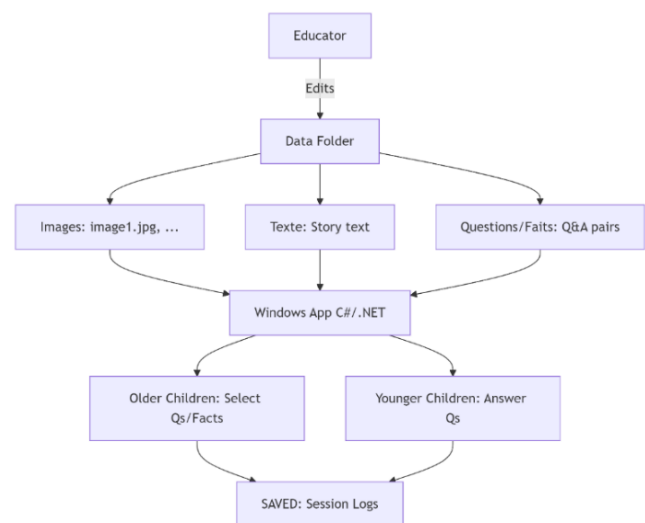


Fig. 3. Suggested system architecture.

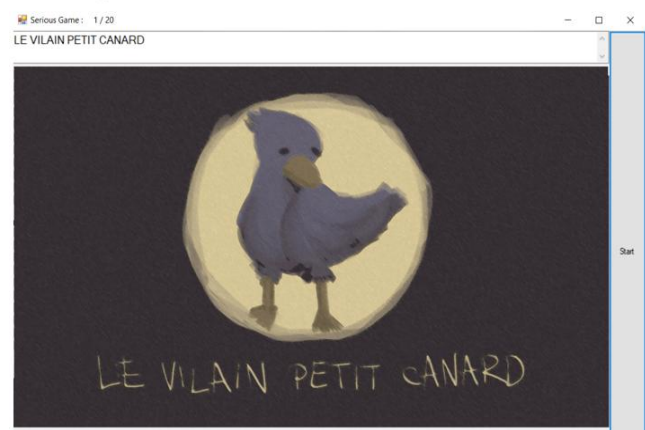


Fig. 4. Serious game with start button on the right.

The second set runs the slideshow, and tries to answer the questions related to each of the shown pictures. The pictures flow one by one according to the set delay and only the chosen questions and facts for each image will be shown. The chosen values by the first set, and the answers by the second set, are both communicated to a therapist for analysis and conclusion about the children's learning progress.

IV. RESULTS

The initial testing was done with four subjects, two from each group. The first two subjects, namely subjects 1 and 2, are 11 years old. The last two subjects, namely subjects 3 and 4, are 7 and 8 years old, respectively. The original setting of "Ugly Duckling" was used.

Subjects 1 and 2 ran the serious game independently, slide by slide, choosing the questions and facts pertaining to each slide. The selected questions and facts are shown in Table IV.

TABLE IV. QUESTIONS AND FACTS SELECTED BY SUBJECTS 1 AND 2, ACCORDING TO PICTURES

Picture	Subject 1		Subject 2	
	Questions	Facts	Questions	Facts
1.	1, 2, 4	a, b, c	1, 4	a, b, c
2.				
3.	4, 9	c	1	i, j
4.	4	d		
5.	4	c, d, f	2	d
6.	2, 4	a, b, c, d	3	f
7.	2, 3, 4	e, f, g	2, 3, 4	e, g
8.	2, 9	a, b, e	2, 10	
9.	2, 10	a, e		
10.	2, 5	b, g	2, 3, 10	g
11.	2, 4	c, e	1, 2, 4, 10	g
12.	4, 9	b, d		
13.	4, 7	c	2	
14.	7, 8	d	9	
15.	4, 10	j	9, 10	
16.	6, 9, 10	b, i	2	
17.				
18.	10, 11	i	4	h
19.	4, 8	h, i, j	9	i, j
20.	4, 5	h, i, j	2, 3, 5, 6	h, i, j

Subject 3 ran the full slide show in the serious game, then went back to each individual picture, in order, and tried to answer the proposed questions by subject 1, and verified the suggested facts. In the following Table V and Table VI, the subject 2 responses to the questions are recorded along with the reaction to the suggested facts. There are 27 confirmed facts and 11 declined facts.

TABLE V. REACTION OF SUBJECT 3 TO QUESTIONS SELECTED BY SUBJECT 1

Picture	Questions	Response
1.	1, 2, 4	1: small and different, 2: sad, 4: sadness
2.		
3.	4, 9	4: happiness, 9: animals
4.	4	4: happiness
5.	4	4: happiness
6.	2, 4	2: love, 4: love
7.	2, 3, 4	2: scared and in pain, 3: hatred, 4: hatred
8.	2, 9	2: sadness, 9: loneliness
9.	2, 10	2: thinking, 10: yes
10.	2, 5	2: scared, 5: it is about animals

11.	2, 4	2: sad and scared, 4: pain
12.	4, 9	4: cold, 9: loneliness
13.	4, 7	4: cozy, 7: I don't know
14.	7, 8	7: I don't know, 8: the duck is surviving
15.	4, 10	4: happiness, 10: yes
16.	6, 9, 10	6: nice story, 9: school, 10: yes
17.		
18.	10, 11	10: yes, 11: no
19.	4, 8	4: happiness, 8: I don't know
20.	4, 5	4: friendly, 5: I like it

TABLE VI. REACTION OF SUBJECT 3 TO FACTS SELECTED BY SUBJECT 1

Picture	Confirmed Facts	Declined Facts
1.	c	a, b
2.		
3.	c	
4.	d	
5.	c, d	f
6.	a, b, c, d	
7.	e, g	f
8.	b, e	a
9.	e	a
10.	g	b
11.	c	e
12.	b	d
13.	c	
14.		d
15.	j	
16.	i	b
17.		
18.	i	
19.	h, i, j	
20.	h, i, j	

Similarly, subject 4 did a similar thing responding to subject 2. In the following Table VII and Table VIII, the subject 4 responses to the questions are recorded along with the reaction to the suggested facts. There are 14 confirmed facts and 4 declined facts.

TABLE VII. REACTION OF SUBJECT 4 TO QUESTIONS SELECTED BY SUBJECT 2

Picture	Questions	Response
1.	1, 4	1: small and different, 4: sadness
2.		
3.	1	1: big and white
4.		
5.	2	2: different
6.	3	3: nothing
7.	2, 3, 4	2: scared and in pain, 3: hatred, 4: hatred
8.	2, 10	2: sadness, 10: no
9.		
10.	2, 3, 10	2: scared, 3: scared, 10: no
11.	1, 2, 4, 10	1: small and different, 2: sad and scared, 4: pain, 10: no
12.		
13.	2	2: safe
14.	9	9: nature
15.	9, 10	9: beauty, 10: yes
16.	2	2: change
17.		
18.	4	4: change
19.	9	9: it is beautiful
20.	2, 3, 5, 6	2: happy, 3: happy, 5: I like it, 6: the story is nice

TABLE VIII. REACTION OF SUBJECT 4 TO FACTS SELECTED BY SUBJECT 2

Picture	Confirmed Facts	Declined Facts
1.	a, b, c	
2.		
3.		i, j
4.	d	
5.	d	
6.		f
7.	e, g	
8.		
9.		
10.	g	
11.		g
12.		
13.		
14.		
15.		
16.		
17.		
18.	h	
19.	i, j	
20.	h, i, j	

V. DISCUSSION

The discussion is divided into two parts: the analysis of the work of subjects 1/2, and the verification of the responses of subjects 3/4.

Subjects 1 and 2 belong to the first group, which is the group that asks the questions and suggests the facts. Subject 1 chose 38 facts in 18 pictures. Subject 2 chose 18 facts across only 11 pictures, omitting facts for several pictures.

Subjects 3 and 4 belong to the second group, which is the group that answers the questions and verifies the suggested facts. Subject 3 confirmed 27 facts and declined 11 facts out of the selected facts by subject 1. The rejection rate is about 29%. Subject 4 confirmed 14 facts and declined 4 facts out of the selected facts by subject 2. The rejection rate is about 22%.

Table IX and Table X show a comparison of the results between the two experiments of subjects 1/3 versus subjects 2/4, in addition to the summarized interactions between the two groups in each experiment, that is, subjects 1 versus 2, and subjects 3 versus 4.

TABLE IX. FACTS COMPARISON FOR SUBJECTS 1/2/3/4

Subjects	Total Pictures	Selected Pictures	Total Chosen Facts	Confirmed Facts	Declined Facts	Rejection Ratio
1 and 3	20	18	38	27	11	29%
2 and 4	20	11	18	14	4	22%
Difference	0	7	20	13	7	7%

As shown in Table IX, all subjects interacted positively towards the serious game. Subject 1 worked on 18 pictures out of 20, with a total of 90%. Subject 3, on the other hand, was

more cautious and only worked on 11 pictures out of 20, with a total of 55%.

TABLE X. QUESTIONS COMPARISON FOR SUBJECTS 1/2/3/4

Subjects	Total Pictures	Selected Pictures	Total Chosen Questions	Answered Questions	Negative Answers
1 and 3	20	18	18	16	2
2 and 4	20	11	28	24	4
Difference	0	7	-10	-8	-2

Concerning the answers to the questions posed by subject 1, Table X shows that subject 3 answered 16 of the 18 questions asked by subject 1. Similarly, regarding the answers to questions posed by subject 2, Table X shows that subject 4 answered 24 of the 28 questions. The ability to answer the questions shows the interest of the second group in the story itself, although in several places, subject 4 answered the question "Do you like it or not?" by saying that he did not like the story. Table X shows a summary of the questions asked in the experiments.

A. Interpretation of Pilot Study Results

The pilot study, while limited in scale, provides initial evidence for the feasibility and potential efficacy of the proposed storytelling system. The results suggest that the game successfully engaged children and promoted active emotional and cognitive processing, rather than passive consumption.

First, the data indicate that the system effectively fostered emotion recognition and articulation. Quantitative analysis shows that younger children correctly identified emotions in 73% of the questions (e.g., labeling "sadness" when the duckling was rejected or "happiness" upon finding the swans). The responses were not just "yes" or "no"; they provided specific emotional labels, demonstrating that the children were actively reflecting on the characters' emotional states and successfully verbalizing them.

Second, the fact verification component promoted critical engagement. The 29% fact rejection rate (Table IX) is a strong indicator that children were not passively accepting the facts provided by their peers; they were deliberating and making their own judgments. For example, subject 3 declined the fact "Ugly" for the first picture, suggesting a more nuanced initial interpretation of the character. This active deliberation aligns with higher-order learning objectives and distinguishes the system from more passive educational tools.

Furthermore, observable age-based differences highlighted the peer-assisted dynamic. Older children tended to frame questions more abstractly (e.g., implicitly asking "Why does the duckling feel lonely?" through their selections), while younger children provided concrete, situational answers (e.g., "He has no friends"). This aligns with Vygotsky's theory, demonstrating how older peers can scaffold more complex thinking for younger ones.

Finally, the high level of general engagement is demonstrated by the fact that the children actively participated throughout the process, with younger subjects answering 29 out of 34 questions posed to them. This indicates that the

narrative and the peer-generated content were compelling and held the children's attention, achieving a primary goal of a serious game.

B. Limitations of the Study

While the pilot study results are promising, this study has several limitations that should be acknowledged. The most significant is the small sample size (N=4), which limits the statistical power and generalizability of the findings. Furthermore, the study was conducted as a feasibility pilot without a control group, making it difficult to attribute the observed engagement solely to the intervention. The use of a single, culturally specific story ("The Ugly Duckling") in French may also influence the results, and the effects may vary with different narratives or cultural contexts. Finally, the short duration of the pilot does not provide insights into the long-term retention of the learned emotional skills. However, the high engagement (75% of participants) and critical fact rejection (29%) observed in our pilot suggest that the collaborative, configurable design successfully promoted active emotional deliberation, a key goal of SEL.

C. Comparison with Related Work

This study's configurable, peer-assisted storytelling model occupies a distinct niche in the landscape of technology-assisted SEL tools. As summarized in Table XI, the proposed system offers a unique set of advantages and trade-offs compared to existing approaches.

Unlike VR-based interventions like the one by Muñoz et al. [2], which offer high immersion at a high cost and technical complexity, our tool prioritizes accessibility and scalability. While VR requires significant investment in hardware and setup, our game runs on standard PCs, making it a viable option for resource-constrained environments like standard classrooms or community centers. This addresses a critical gap in making SEL technologies widely available.

Furthermore, our design differs from many serious games that focus on solo play [1, 10]. By structuring the interaction around two age groups, we explicitly leverage Vygotsky's social development theory [3], where learning is scaffolded through social interaction. The older children act as mentors, constructing the learning experience, while the younger ones benefit from this guided practice. This peer-assisted model can reduce the facilitator's direct workload and foster a collaborative learning community, an aspect often missing in solo-focused games.

Finally, the configurable nature of the system is a key differentiator. Unlike fixed-content games [11, 12], our tool allows educators to adapt stories, questions, and facts to local curricula, cultural contexts, and specific learning objectives without any programming. This flexibility is a significant pedagogical advantage, allowing the tool to remain relevant across different settings and student needs, a feature not commonly emphasized in other serious games.

The primary practical implication of this design is its facilitation of peer-mediated learning. By enabling older children to scaffold emotion education for younger peers, the system can reduce the direct workload on teachers and therapists while fostering a collaborative classroom

environment. Furthermore, its low-cost, PC-based design directly addresses resource gaps in schools, making effective SEL tools accessible where expensive VR setups are not feasible. Educators can leverage this configurability not only to adapt stories to local curricula but also to establish cross-age mentorship programs, positioning older students as 'emotion coaches'.

In conclusion, the novelty of this work lies not in a single technological breakthrough but in the integrated design approach that combines configurability, a structured peer-assisted learning model, and a low-cost, scalable implementation to address practical challenges in SEL education.

This approach yields several key advantages over more technologically complex interventions like VR-based SEL tools [2]. As detailed in Table XI, our tool's primary strength is its cost-effectiveness and scalability, eliminating the need for expensive, high-maintenance hardware and making it viable for low-resource settings. Pedagogically, it leverages Vygotsky's social development theory by structuring peer-assisted learning, which our pilot study suggests fosters deeper cognitive engagement, as evidenced by the 29% fact rejection rate. Furthermore, the design offers greater safety and inclusivity, avoiding issues like motion sickness and being potentially more suitable for neurodiverse children who may find full VR immersion overwhelming.

While VR offers unparalleled immersion, our configurable storytelling game provides a complementary, accessible pathway for deploying SEL tools at scale. Future work will be necessary to quantitatively benchmark its efficacy against such VR benchmarks in larger, controlled trials. These key differentiators are summarized in Table XI.

TABLE XI. COMPARISON: PEER-ASSISTED STORYTELLING GAME VS. VR-BASED SEL TOOLS

Feature	Our Storytelling Tool	VR-Based SEL Games (e.g., Muñoz et al., 2022)
Cost	Low: Requires only a PC (C#/Windows). No specialized hardware.	High: VR headsets (300–1,000 per unit) + high-end PCs.
Scalability	High: Easily deployable in classrooms/therapy centers; configurable for new stories/languages.	Low: Limited by VR hardware availability, setup complexity, and space requirements.
Efficacy	Moderate-High: Peer-assisted learning fosters engagement (75% in pilot) and critical thinking (29% fact rejection). Supports Vygotsky's social constructivism.	High: Immersive VR enhances engagement and retention but risks overstimulation for young children.
Accessibility	Broad: Works on low-end PCs; no motion sickness risks. Suitable for ages 6–12.	Limited: VR unsuitable for children <10 (safety concerns); requires tech-savvy facilitators.
Pedagogical Flexibility	High: Educators can modify stories/questions without coding. Supports cross-age mentorship.	Low: Content updates often require developer intervention.
Evidence Base	Pilot study (N=4) shows feasibility. Needs larger trials.	Strong evidence for engagement but limited studies on long-term SEL outcomes.

VI. CONCLUSION

Serious games are proven to be useful in many education domains for children, adults, and the elderly. In this work, a serious game is developed to teach emotions through a configurable, peer-assisted storytelling system. A pilot study using "The Ugly Duckling" fairy tale demonstrated the system's feasibility and its ability to foster engagement and critical thinking in young children, as evidenced by high interaction rates and active fact verification. The results indicate a promising foundation for using this tool in social-emotional learning. Future work will focus on conducting larger-scale trials with more subjects and control groups to establish statistical significance. Additionally, testing in diverse cultural contexts is planned, with upcoming evaluations in a Romanian pre-school using localized stories.

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