Digital STORYTELLING

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Digital Storytelling (DST)

- A process of generating a digital story on a digital platform.
- This story is both written and enriched with multimedia components.

(Armstrong 2003; Lambert 2010)

Digital Storytelling (DST)

- Experimentation with (digital) multimodal text design is necessary for students' development as readers and writers.
- DST fosters critical thinking
- DST promotes cultural competence
- "playful tinkering"

(Yang & Wu, 2012; Niemi et al. , 2014; Hwang et al., 2023; Grant & Bolin, 2016; Fariziah Nur Humairoh 2023; Marsh, 2006; Vincent,2006; Burnett, 2010; Kress, 2010; Kress, 2021; Parry & Taylor, 2021)

Digital Storytelling (DST) & struggling writers

- Reluctant writers and students who perform at (very) low levels in writing are able to show highly communicative skills when they integrate words with other semiotic resources.

- DST enhances writing skills, especially for struggling writers.

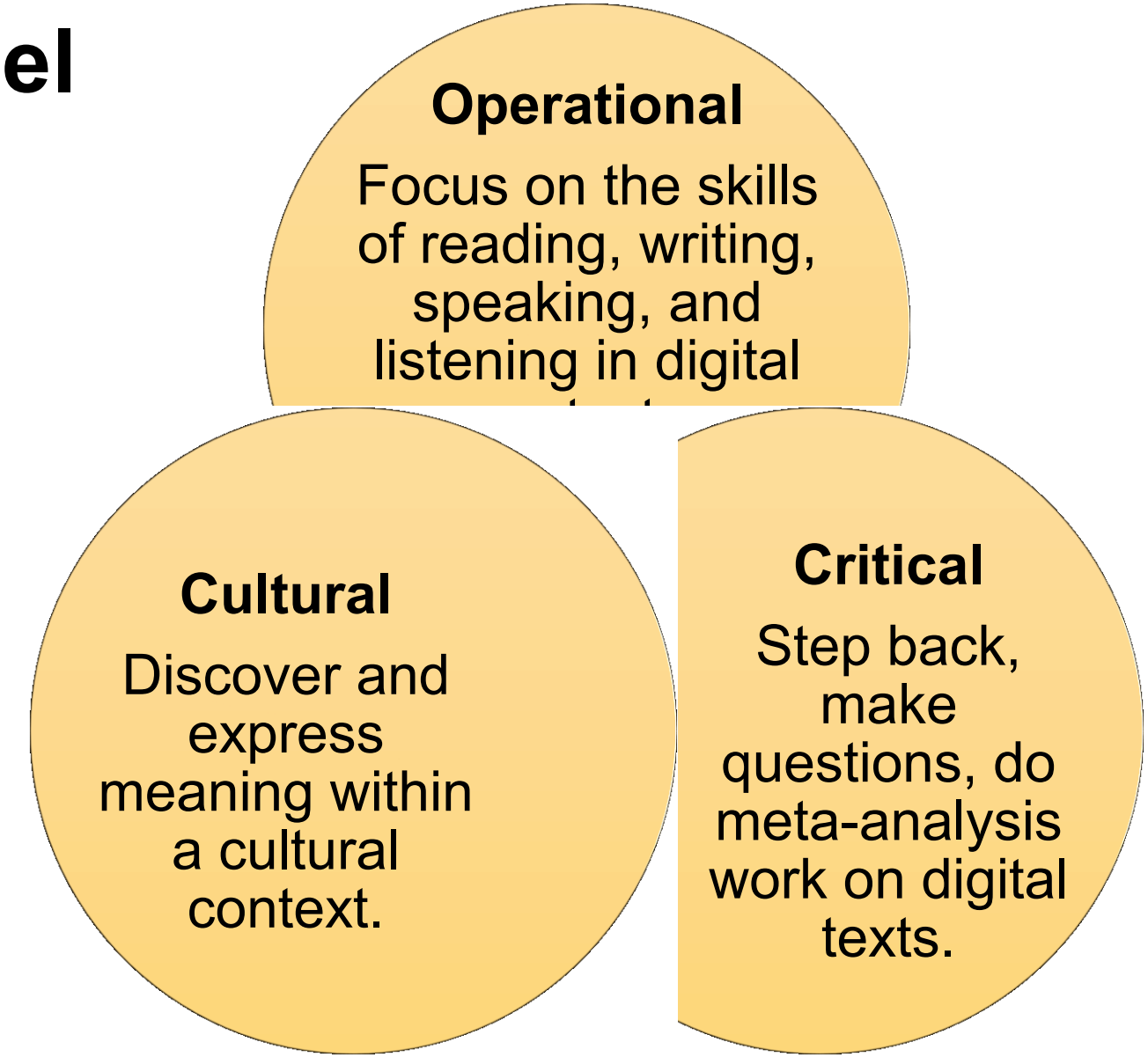
(Daiute 1992;Vincent 2006; Robin, 2016; Foley, 2013; Miller, 2010; Sylvester & Greenidge,2009)

Multimodal Literacies and Digital Storytelling

There is a need to consider the multimodal nature of literacies in the context of digital storytelling.

(Lankshear & Knobel, 2008; Kress, 2010; Goodfellow, 2011)

Green's 3D Model



Dyslexia

Frith's three-level framework (1997,2002)

- Biological level
- Cognitive level
- Behavioural level

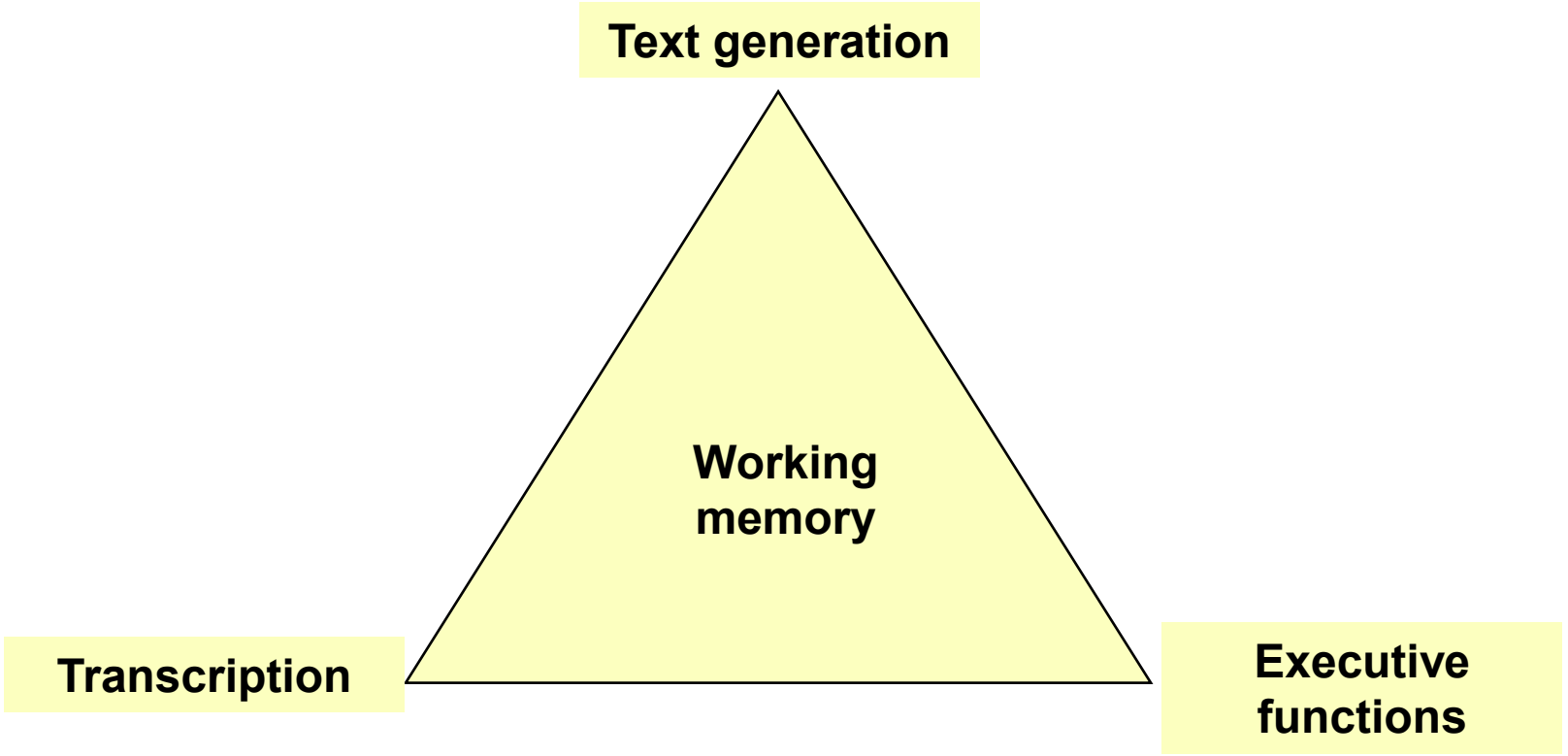
New definition:

- Dyslexia is a set of processing difficulties that primarily affect reading and spelling (Holden et al., 2024).
- Dyslexia's progression is influenced by both genetic and environmental factors (Carroll et al., 2024).
- Dyslexia often overlaps with other developmental difficulties.

Dyslexia and writing challenges

The not-so simple view of writing

(Berninger & Winn, 2006)



Research design & participants

- Pre-experimental A- B design (observing improvements on the same individuals over time);
- Mixed methods approach

Participants' ID	Gender	Age (years)	Grade	Diagnosis
P1	Male	12	6th	Specific learning difficulties - dyslexia
P2	Male	12		
P3	Female	12		
P4	Male	12		
P5	Male	12		
P6	Female	11		
P7	Male	12		
P8	Male	12		
P9	Female	12		
P10	Female	11		
P11	Female	12		
P12	Female	12		
P13	Male	11		

2-hour Collaborative activity

Participating students were informed about the activities via treasure hunt.

2-hour Collaborative activity

Group discussion was carried out, aiming to answer potential questions and provided further information.

2-hour Individual/ collaborative activity

Students chose their topic between suggested.

Groups were split up based on their choice of topic with students who choose the same topic being in the same group.

4-hour Individual/ collaborative activity

Students identified the purpose of their stories and their audience.

Through brainstorming, students shared their knowledge about the topic.

2-hour Individual/ collaborative activity

Students identified areas they wish to explore further about the topic.

2-hour collaborative activity

Students conducted follow-up research on the topic in the school library.

2-hour Individual activity

Students created story maps on paper to organise story elements and ideas.

2-hour Individual activity

Students created their story on paper. Sentence fragments were provided as scaffolding.

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2-hour Individual activity

Students revised their work based on a self-assessment checklist .

4-hour Collaborative activity

Students received feedback and comments.

2-hour Individual activity

Students made final edits to their work.

2-hour Individual/ collaborative activity

Students discussed in their group and found means for their story dissemination.

2-hour collaborative activity

Students were introduced to Storyjumber.

2-hour Individual/ collaborative activity

Students chose their topic between suggested.

Groups were split up based on their choice of topic with students who choose the same topic being in the same group.

4-hour Individual/ collaborative activity

Students identified the purpose of their stories and their audience.

Through brainstorming, students shared their knowledge about the topic.

2-hour Individual/ collaborative activity

Students identified areas they wish to explore further about the topic.

2-hour collaborative activity

Students conducted follow-up research on online resources.

4-hour Individual activity

Students organised the key elements of story plot in the boxes of the digital storyboard.

10-hour Individual activity

Students was typing the script in the boxes of the digital storyboard, while adding images, sounds, and voice recordings.

4-hour Individual activity

Students revised their work using a self-assessment checklist and spell-checker as supportive tools.

4-hour Collaborative activity

Students received feedback and comments through group discussions.

2-hour Individual activity

Students made final edits to their work.

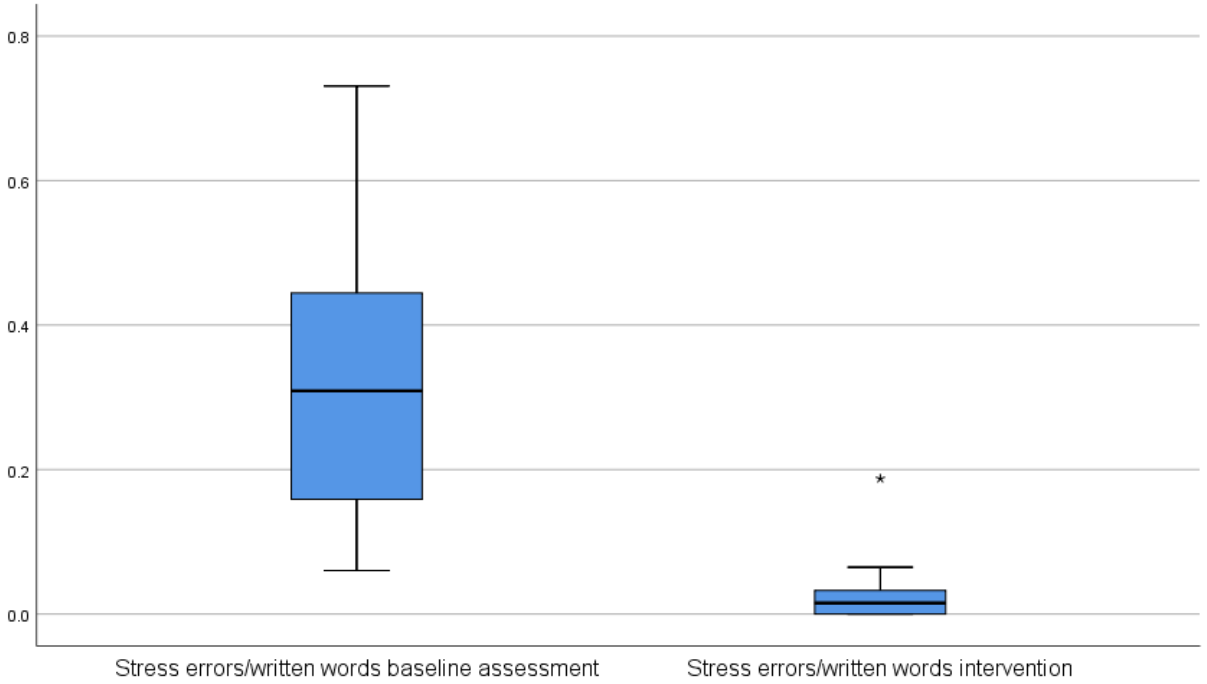
2-hour Individual/ collaborative activity

Students discussed in their group and found means for their story dissemination.

Results- RQ1

How might digital storytelling influence the writing skills of primary school students with dyslexia, including spelling when using the keyboard, semantic difficulties, and self-regulation behaviours?

- The greatest reductions were in stress errors (median reduction: 0.27; 95% CI: 0.12–0.44, p=0.001; effect size: 1.99)
- orthographic errors (median reduction: 0.20; 95% CI: 0.08–0.24, p=0.01; effect size: 2.40),
- primary punctuation, grammatical, and phonological errors also were decreased significantly.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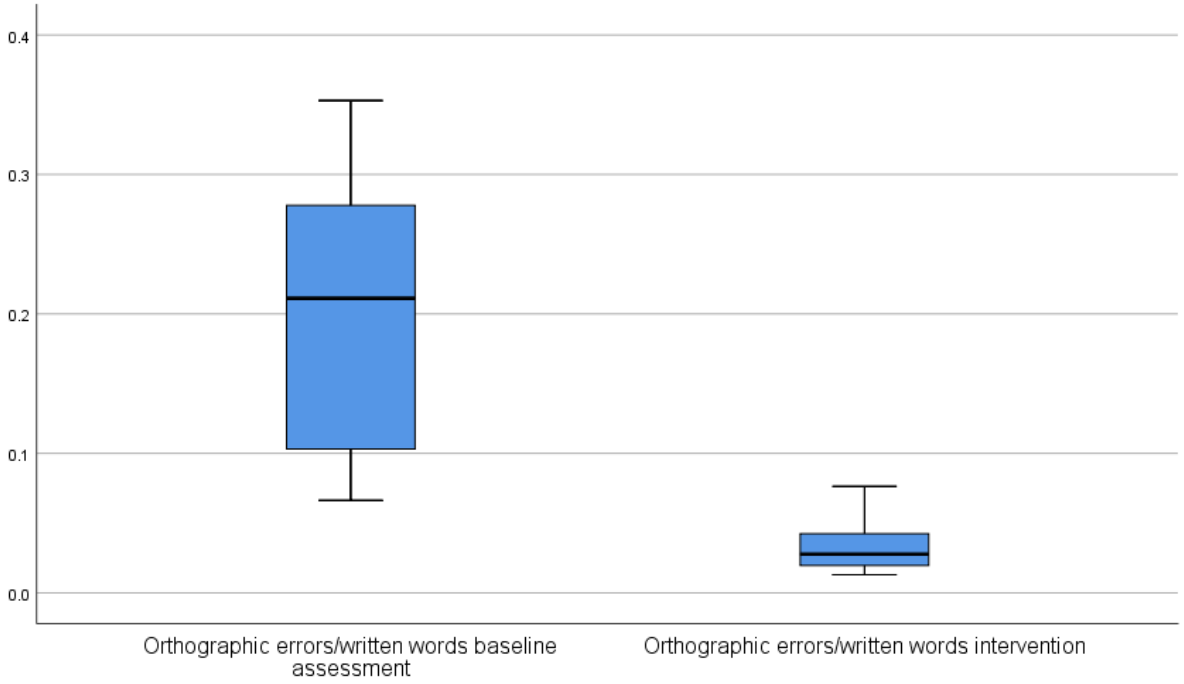
Stress errors/written words baseline assessment
Stress errors/written words intervention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Orthographic errors/written words baseline assessment
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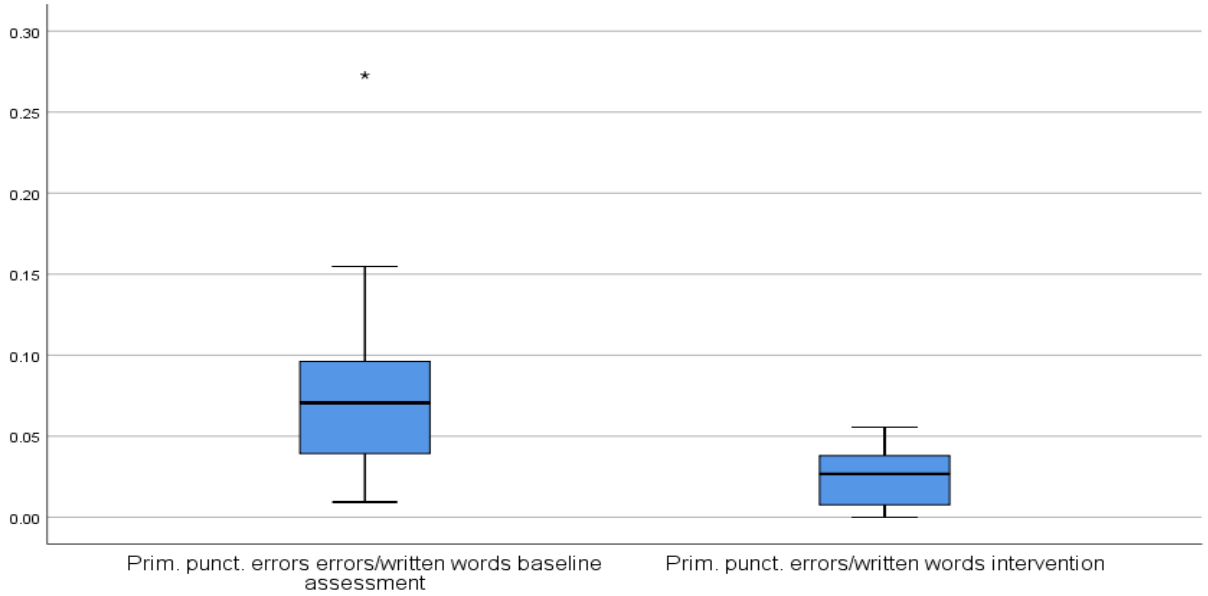
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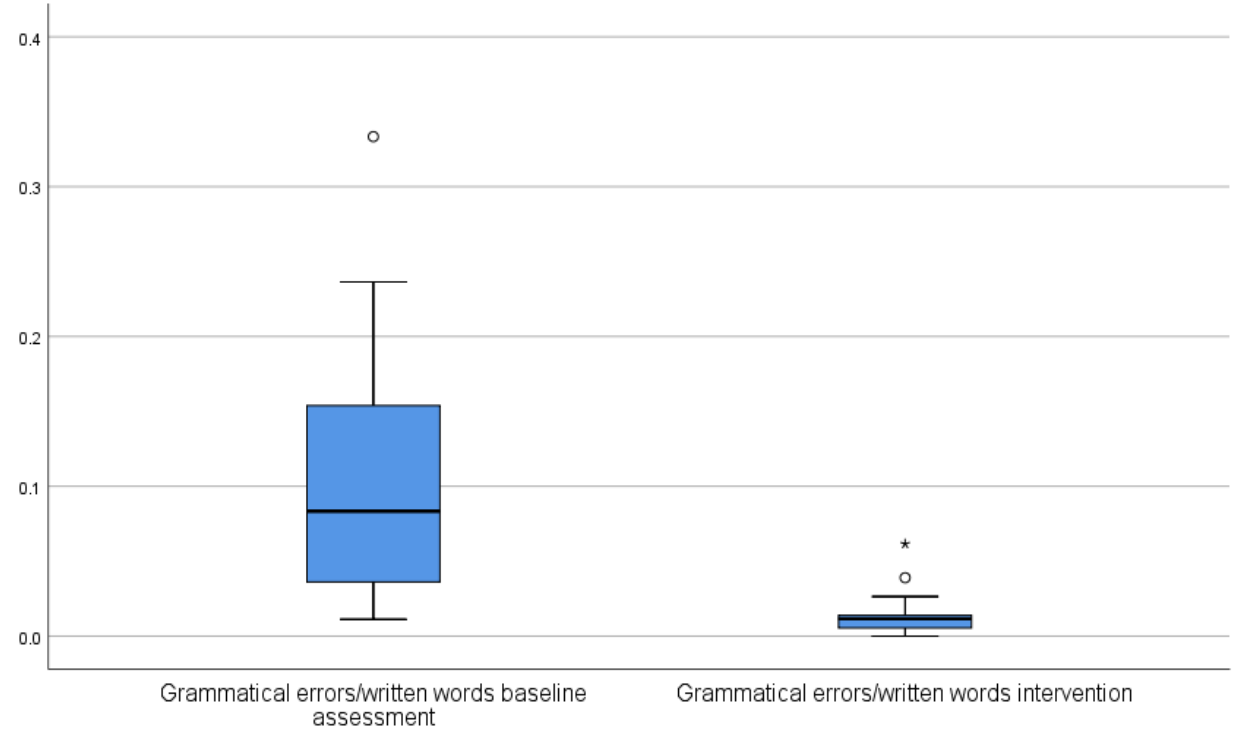
Prim. punct. errors errors/written words baseline assessment
Prim. punct. errors/written words intervention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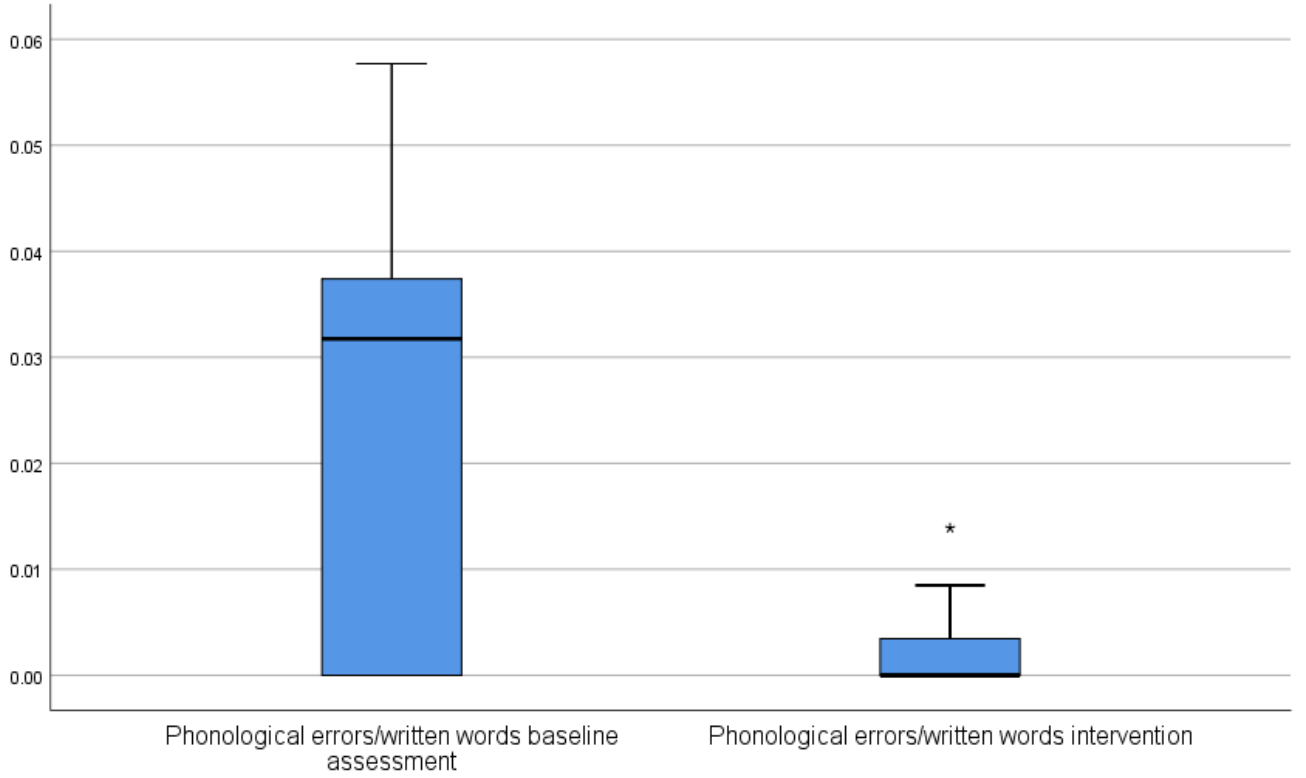
Grammatical errors/written words baseline assessment
Grammatical errors/written words intervention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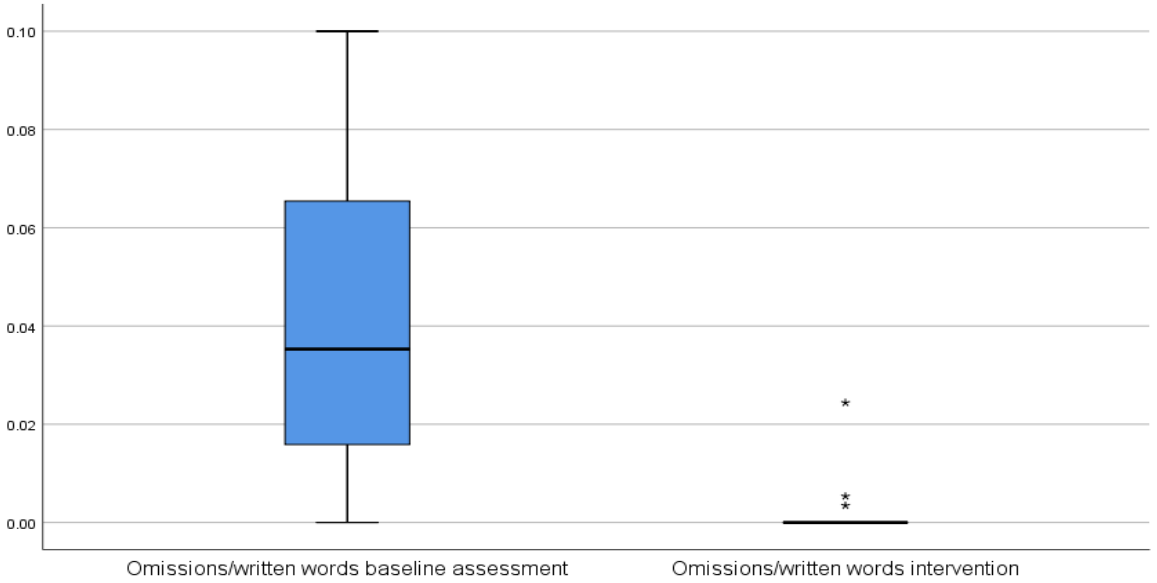
Phonological errors/written words baseline assessment
Phonological errors/written words intervention

Results- RQ1

- The semantic errors with the most significant reduction were omissions (p-value of 0.004 and Cohen's D=1.66).
- Repetitions and missing interword space words both had significant reductions with p-values of 0.028 and moderate effect sizes (Cohen's D=0.87 and 0.86, respectively).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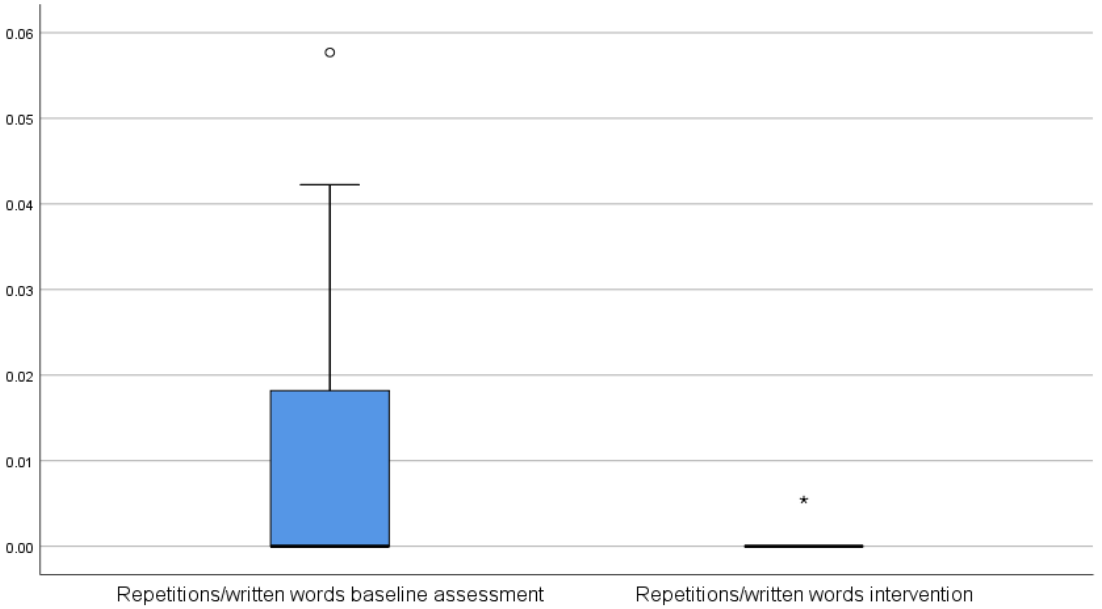
Omissions/written words baseline assessment
Omissions/written words intervention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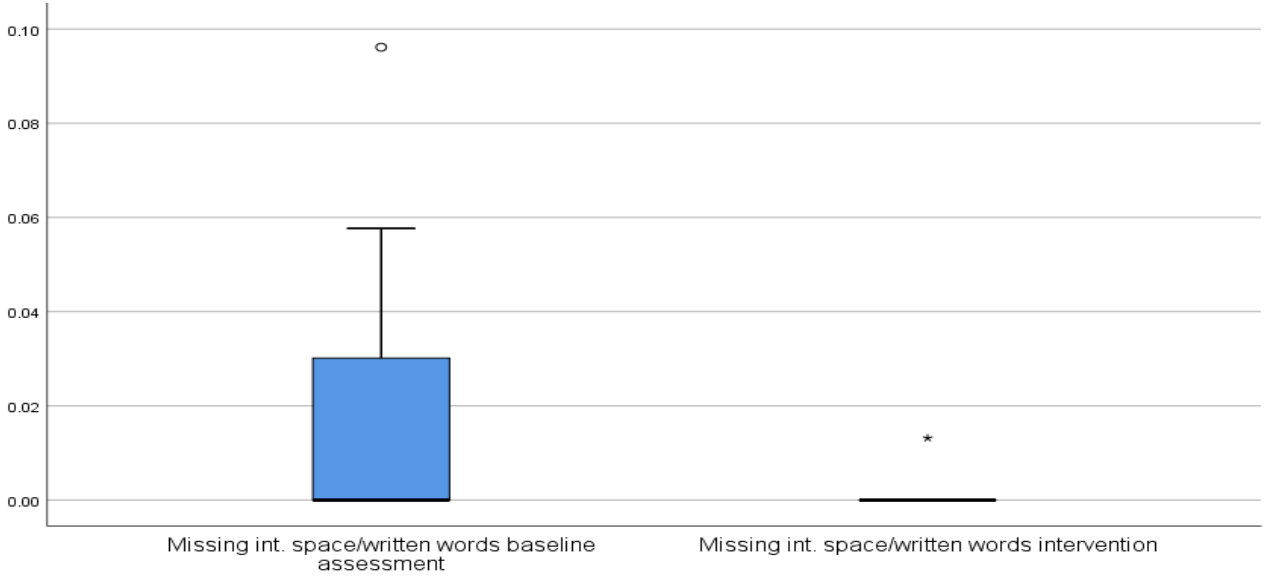
Repetitions/written words baseline assessment
Repetitions/written words intervention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Missing int. space/written words baseline assessment
Missing int. space/written words intervention

Results-RQ1

Self-regulation behaviours	Baseline Median (min,max;IQR)	Intervention Median (min,max;IQR)	p-value
1.1.2.c Make research on the topic of writing; determine the digital sources to research *(Planning)*	2.0 (1.0, 3.0; 1.0)	3.0 (2.0, 4.0; 0.8)	**0.006**
1.1.2.d d. Organise the structure of the plot in the digital storyboard *(Planning)*	2.5 (2.0, 3.0; 0.5)	3.0 (2.0, 4.0; 0.5)	**0.002**
1.2.2.a. Select modes of convening the message *(Self- selecting modes)*	1.0 (1.0, 2.0; 1.0)	3.5 (2.5, 4.0; 0.9)	**0.001**
1.3.1.d. Check and correct the spelling of the words and the punctuation. *(Self-monitoring)*	2.0 (1.5, 3.0; 1.4)	3.0 (3.0, 3.0; 0.0)	**0.006**
1.3.3.a. Make final changes including those suggested by peers *(Revising/finalising*	2.0 (1.5, 3.0; 0.5)	3.0 (2.0, 3.5; 0.5)	**0.002**
1.4.1.a. Select means of dissemination (Self-selecting means)	2.0 (1.0, 2.5; 0.9)	3.0 (2.5, 4.0; 0.8)	**0.005**

Results-RQ1

Themes (TM)	Subthemes (STM)	Number of participants	Number of times coded
1. Goals setting	1.1 Identification of the writing purpose	6	13
	1.2 Determination of the intended audience	9	20
	1.3 Identification of the main idea	10	19
2. Planning	2.1 Customisation	7	10
	2.2Child-friendly design	10	11
	2.3 Functional Advantages of Digital Storyboarding	5	6
	2.4 Organisation	8	15
	2.5 Mediate handwriting difficulties	6	7
3. Self-selecting modes	-	2	2
4. Self-monitoring	4.1 Corrections and Changes	10	16
	4.2 Identify writing mistakes	7	12
5. Revising/finalising	5.1 Commenting and Feedback	11	20
	5.2 Attitudes towards changes	4	5
6. Self-selecting dissemination means	-	4	5
7. Independence	7.1Features of DST platform	8	10
	7.2 Idea development	4	5

P5: *“You could change the size of boxes just by clicking. On paper you have to erase, then to draw again, then to erase and so on. This is really boring and frustrating”.*
(2. Planning -2.2 Child-friendly design)

P7 : *"It was better because they were clearly separated. I knew exactly where to place each element of my story. I did not have to erase the box to make it bigger and write, like on storymaps on paper.”*
(2. Planning- 2.4 Organisation)

P8 : “*I liked that I did not have to just write everything. I could mix colours, pictures and words to show what I was imaging. I could activate my imagination in choosing the modes. If I thought of something sad, I would pick dark colors and a sad music to match it”.*
(3. Self-selecting modes)

P4 : *"The computer underlined, showed my spelling mistakes, so I knew when something was wrong. It made it easier to correct them before I forgot."*

(4. Self-monitoring -4.2 Identify writing mistakes)

Results-RQ2: *How might digital storytelling influence the perceptions of students with dyslexia about themselves as writers?*

Themes (TM)	Subthemes (STM)	Number of participants	Number of times coded
1. Negative feelings towards traditional writing	-	13	29
2. Neutral attitudes towards traditional writing	-	10	12
3. Negative self-perception as writers	-	7	9
4. Writing difficulties	4.1 Idea challenges	12	21
	4.2 Transcription challenges	10	18
	4.3 Semantic difficulties	4	5
	4.4 Executive function difficulties	5	5
	4.5 Expression difficulty	11	16
	4.6 Cognitive overload	3	3
5. Familiarity with DST platform	5.1 Diverse experiences	9	11
	5.2 Interest in exploring DST process	6	7

Results-RQ2

P13: “*When I writing a story I get anxious, because I think I will make orthographic mistakes, I will make mistakes”*
(1. Negative feelings towards traditional writing)

P3: “*I like it when the topic is my choice (2. Neutral attitudes towards traditional writing)*

P8 : "*I am not a good writer. I make a lot of spelling mistakes and mistakes in using words”*
(3. Negative self-perception as writers)

P10 : “*My spelling is not perfect. This makes me think a lot about the words and forget what I want to write.”*
(4. Writing difficulties-
4.6 Cognitive overload)

Results-RQ2

Themes (TM)	Subthemes (STM)	Number of participants	Number of times coded
1. Positive attitudes towards writing	1.1 Positive feelings	7	12
	1.2 Overcoming initial concerns related to the DST	7	8
	1.3 Enhanced content quality	13	30
	1.4 Multimodal communication	13	14
	1.5 Customisation	6	7
	1.6 Improved Collaboration	4	4
2. Positive self-perceptions as writers	-	9	15
3. Mitigate writing difficulties	3.1 Idea development	7	12
	3.2 Mitigate transcription challenges	9	19
	3.3 Mitigate semantic difficulties	5	5
	3.4 Boost Executive function behaviours	8	11
	3.5 Deal with cognitive overload	5	5

Results-RQ2

P13: "*I felt a sense of excitement because I could combine images, sounds and the outcome was really nice"*
(1. Positive attitudes towards writing - 1.1 Positive feelings)

P12 : "*I could write much faster on the computer. Typing my ideas was less time-consuming than writing by hand, which helps me stay productive."*

(2. Positive self-perceptions as writers)

P4 : "I *felt more independent. I mean I could do many things on my own without your help, such as correcting my orthographic mistakes or organise my text and images. And I believe that what I wrote on the computer was better than what I wrote on paper."*

(2. Positive self-perceptions as writers)

P9 : "*I stuck in the middle of my story. Then, I saw the image with the ship in the clear environment which I had already put and I thought that people also live healthy in villages and I wrote it."*
(3.Mitigate writing difficulties- 3.1 Idea development)

Results-RQ3: *To what extent does digital storytelling provide opportunities for students with dyslexia to bring their own perspectives into the multimodal writing process considering the cultural context according to the cultural dimension of Green's 3D model?*

Cultural Behaviours	Baseline Median (min,max;IQR)	Intervention Median (min,max;IQR)	p-value
3.1.3.a Make meaningful decisions for the resources based on their experiences *(Explore topic information)*	1.0 (1.0, 3.0; 1.0)	3.5 (2.5, 4.0; 1.0)	**0.001**
3.1.4.a Choose modes that are making meaning to them *(Select modes of communication such as text, images, music)*	2.0 (1.5, 2.0; 0.5)	3.5 (3.0, 4.0; 1.0)	**0.001**
3.1.4.b. Choose modes that are making meaning to their intended audience *(Select modes of communication such as text, images, music)*	2.0 (1.0, 4.0; 1.0)	3.5 (3.0, 4.0; 1.0)	**0.001**
3.2.1.a. Draw on their own experiences in the creation of the script, bringing their own understandings to it (*Create plot)*	2.0 (1.0, 4.0; 1.5)	3.0 (2.0, 3.5; 1.5)	**0.009**
3.2.2.a. Allow feelings and thoughts to shape the production experience *(Combine diverse modes to make meaning)*	1.50 (1.0, 3.0; 1.3)	3.0 (2.5, 4.0; 0.8)	**0.002**

Results-RQ3

Themes (TM)	Subthemes (STM)	Number of participants	Number of times coded
1. Topic based on students' background	-	13	13
2.Social and cultural context	2.1 Inclusivity	5	6
	2.2 Cultural relevance	6	6
	2.3 Audience engagement	8	11
3.Emotional expression	3.1 Diverse modes for emotional expression	9	10
	3.2. Emotional impact of writing medium	8	9
4. Feedback based on students' background		6	7

Results-RQ3

P1 : *“[...] They will be able to listen to it if they cannot read well and struggle, for example, if they have dyslexia like me”*

*(2 .Social and cultural context-
2.1 Inclusivity)*

P12 : “*The sad guitar music was for when the story spoke about the consequences of war. All we can understand that this sound means sadness.”*

*(2 .Social and cultural context-
2.2 Cultural relevance)*

P9 : "*I can’t always find the words for how I feel. Sometimes, choosing the right picture shows it. It's like it speaks for me."*

*(3.Emotional expression-
3.1 Diverse modes for emotional expression)*

P1 : *“How did I give feedback on spelling when I’m not sure how the words were written? And don’t talk to me about the lexicon because it’s ridiculous—it’s even more difficult.”*
P1 : “I struggled with reading, so when I saw how clear and simple the language was in P2’s story, I found it clever.”
(4. Feedback based on students’ Background)

Results-RQ4: *To what extent does digital storytelling enhance the ability of children with dyslexia to engage in critical analysis and reflection on their writing, consistent with the critical dimension of Green's 3D model?"*

Critical Behaviours	Baseline Median (min,max;IQR)	Intervention Median (min,max;IQR)	p-value
4.1.2 a. Reflect critically: why did I choose these sites and this information? How do they align with the topic ? *(Explore topic information)*	1.0 (1.0, 4.0; 1.5)	4.0 (2.5, 4.0; 1.0)	**0.003**
4.1.4.a. Why did I choose these modes? *(Select modes of communication, such as images, music, sounds)*	2.0 (1.0, 2.5; 0.5)	3.5 (2.5, 4.0; 1.0)	**0.001**
4.2.2.a. Reflect critically on their choices (i.e. Why did I combine this image/sound with this part of the story?) *(Combine diverse modes to make meaning)*	1.0 (1.0, 2.0; 1.0)	4.0 (2.5, 4.0; 1.0)	**0.001**
4.4.1.a Reflect critically on their choices: Why did I choose these means? *(Choose means to distribute their digital stories)*	1.0 (1.0, 4.0; 1.8)	3.0 (2.0, 4.0; 0.5)	**0.010**

Results-RQ4

Themes (TM)	Subthemes (STM)	Number of participants	Numbers of times coded
1. Critical thinking while writing on paper	1.1 Transcription	9	15
	1.1 Text comprehension	3	3
2. Critical thinking while writing on DST platform	2.1 Content quality	7	8
	2.2 Selection of modes	6	7
	2.3 Combination of modes	8	12
	2.4 Changes within the mode	4	4
	2.5 Audience engagement	8	9
	2.6 Cognitive Resources Redirected Towards Critical Thinking	6	8
3. Critical self-reflection during writing on DST platform and paper	3.1 Awareness of errors	6	7
	3.2 Recognising areas of improvement	5	5
4. Critical reflection on the feedback	-	7	8

Results-RQ4

P8 : *"I had to think about what picture would show the calm emotions of peace and put it in the correct part within the text."*

(2 .Critical thinking while writing on DST platform - 2.3 Combination of modes)

P12: "*I enlarged the picture of the wolf to show how dangerous this animal is."*

(2 .Critical thinking while writing on DST platform - 2.4 Changes within the mode)

P6 *: "[…] Your spelling mistakes, which were underlined and you simultaneously thought about why they are written that way[…] On paper we did not know how to find or correct them" .*

(3. Critical self-reflection during writing -3.1 Awareness of errors)

P5 : *"When I heard the feedback, I thought 'does this make sense?' Then I decided if it was good or not. For instance when P9 said to change some pictures because they were repeated, I did it. She was right".*

(4. Critical reflection on the feedback)

Contribution

DST Framework

- Guides educators through all DST phases: **pre-production, production, and distribution**.
- **Adaptable and non-prescriptive**, allowing **differentiated learning** and **multimodal expression**.
- Enables learners to design stories using **modes**, fostering **student voice, identity, and agency**.

Contribution

✍Three Core Domains of Digital Writing

- **Cultural** : Reflects students' identities, voices, and backgrounds.
- **Critical** : Promotes metacognition through story revisions and design analysis.
- **Self-Regulation**: Enhances planning, self-monitoring, and revising with tools like storyboards and spellcheckers.

Enhancing Student Self-Perception.

- Builds **confidence** in students with literacy difficulties, encouraging **creativity** and **self-expression**.

Contribution

Policymakers

- Recommends **DST integration into Initial Teacher Education (ITE)** and **ongoing CPD**.
- Calls for **resources** (e.g., access to devices) to enable universal student participation.
- Encourages **public sharing of student work** through exhibitions, competitions, and archives to:
- Celebrate creativity
- Offer models for teachers
- Shift perceptions of literacy

The following links include participants' digital stories:

P1
https://www.storyjumper.com/book/read/170177281/66c06730d756d#

P2
https://www.storyjumper.com/book/read/170162971/66bb82cceb16b#

P3
https://www.storyjumper.com/book/read/170461771/66b5d1330c364#

ORIGINAL ARTICLE

https://nasenjournals.onlinelibrary.wiley.com/doi/10.1111/1471-3802.12722

Digital storytelling: An educational approach for enhancing dyslexic children's writing skills, critical and cultural learning

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Abstract

This paper reports an exploratory pilot study- which is part of a larger study- examining the impact of an innovative approach to enhancing the writing skills of primary school students with dyslexia, digital storytelling (DST), linked to critical and cultural learning. The study adopted a single-subject design with a pre-experimental approach (A-B) to explore connections between the use of digital storytelling, and children's writing skills, as well as cultural and critical dimensions of learning. A socio-cultural framework, drawing on Green's 3D model, and the Not-So Simple View of Writing, informed the methodology adopted. A dual perspective aligning with the socio-cultural theory was adopted, delving into both product and process of digital storytelling. The results revealed significant improvements in writing skills, cultural and critical behaviours, pre and post intervention, with large effect sizes, suggesting this may be a promising classroom approach to improve literacy and learning in children with dyslexia.


THANK
YOU!