



Comics for inclusive English language learning: the CIELL app, supporting dyslexic English language learners

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Abstract. As teaching moves increasingly online, language teachers are faced with the challenge of how to support dyslexic students in an inclusive manner in and out of the classroom. This paper will focus on an innovative educational multi-modal, mobile application – Comics for Inclusive English Language Learning (CIELL) – supporting upper-intermediate and advanced English as a Foreign Language (EFL) students with dyslexia when faced with language proficiency tests and academic writing tasks. A cyclical educational design research methodology (McKenney & Reeves, 2019) was used to include three cycles of feedback from stakeholders so that their views and suggestions would inform the development of an alpha, beta, and gamma version of the app, thereby maximising practical relevance. The discussion of the quantitative and qualitative feedback is supported by educational design research.

Keywords: mobile learning, dyslexia, educational design research.

1. Introduction

Dyslexia, as mentioned on the CIELL website³, is a specific learning difference characterised by difficulties with word decoding, spelling, handwriting, reading, memory, and attention span which affects around 10% of the UK population. Dyslexic-type difficulties also cause challenges in writing in another language, which is often assessed in high-stakes testing contexts and is an essential skill

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in higher education across Europe (Kormos & Smith, 2012). The introduction of comics, being used by teachers for many years, to encourage reluctant readers, to make learning fun, and to strengthen confidence and enjoyment in reading, was deemed as an interesting approach for the research team for the development of the planned learning intervention through the app. Educational research suggests that art improves memory and academic outcomes (Hardiman, Johnbull, Carran, & Shelton, 2019). Sousanis (2015) argues for the value of visual thinking in teaching and learning as it can help us to understand multiple perspectives. He proposes that words and images are equal partners in meaning-making and that understanding is always an active process of evaluating different perspectives. This is our reason, our theoretical basis, for promoting visual representations in teaching writing. Specifically, the CIELL app supports dyslexic students preparing for the written component of high-stakes language proficiency exams such as IELTS and Cambridge Advanced and Proficiency. It focuses on supporting the process of planning opinion essays, reviews, and article writing. Writing guidelines and sample essays have been created in comic form and visual representations in the form of an infographic presenting a basic essay structure. The topics of the 17 sample essays have been based on the 17 United Nations sustainable development goals for 2030 (see [supplementary materials](#), Appendix A).

Educational research design, which focuses on solving real world problems through effective interventions, will be presented. Elements of this methodology engage both the researchers and target group in analysis and exploration, design and construction, evaluation and reflection, and implementation and spread (McKenney & Reeves, 2014). It is an iterative cycle in which interventions are created, tested, adopted, implemented, re-tested, and refined. The quantitative and qualitative feedback received from the researchers and target groups gave insight in how to effectively address successful strategies to be implemented through an app to support dyslexic learners in advanced level writing. The paper will discuss the three iterative evaluation cycles that influenced the development of the CIELL app.

2. Method

An interdisciplinary pool of EFL instructors, technology-enhanced researchers, a software developer, and an artist from the UK, Cyprus, Germany, and Greece participated in the design of the CIELL app, which was shaped by the opinions of key education stakeholders so that the design is informed by their views and maximises practical relevance. The reason that this approach was adopted was to

ensure that user perceptions influenced the design and development of the app, thereby maximising practical relevance as well as incorporating Universal Design for Learning (UDL, 2021) principles. UDL aims to minimise obstacles to learning and increase flexibility, thereby making designs more accessible to students, for example, by providing audio and video; the stories in the app can be read aloud by learners who struggle with reading in English as well as by learners using their mobile phones.

3. Results and discussion

The three iterative cycles of evaluation present data that contributed to the further development and enhancement of the CIELL app. The survey questions used were developed using a five-point Likert scale and open-ended questions. Each survey generated quantitative and qualitative data. Each cycle will be reviewed and the data presented will illustrate the importance of the participative approach in developing a learning intervention to support EFL learners with dyslexia.

3.1. Cycle 1

The process began with a stakeholder survey (N=79) to establish the potential acceptance of the app and the area of the curriculum in English language learning. The survey data show an overall positive response towards the use of software apps in teaching and learning. Moreover, the participants' responses to the challenges faced in English language learning as a second or foreign language indicate the following areas of high importance: speaking, understanding speaking, understanding written text, and writing essays. Spelling and vocabulary learning were of least concern.

The first cycle of design, development, and evaluation concluded with an evaluation by 376 language teachers interested in how to teach students with dyslexia and other specific learning difficulties. Their written comments about the app and its potential use were thematically analysed according to Braun and Clarke (2006), and used to refine the design for Cycle 2. The thematic analysis of the responses for the alpha version of the app reveal the following four themes:

- it helps students understand the structure/format of essay writing;
- the visual image/info-graphics and audio explore different learning styles;
- it is relevant to meeting the needs of dyslexic learners – multisensory and interesting; and

- it provides the chunking of knowledge to reduce cognitive overloading.

Possible suggestions for the improvement of the app are cited by the stakeholders as (1) use lighter colours for the illustrations, (2) make the tasks more interactive, and (3) provide instructions concerning how to use the app. All suggestions were implemented, especially the inclusion of the Teachers' Compendium, giving insight into the development and use of the app in teaching and learning.

3.2. Cycle 2

The second cycle concluded with an evaluation of the app by piloting teachers (N=10) and their learners (N=183, 12.5% self-declared dyslexia as a learning difficulty) who provided feedback via two questionnaires (see [supplementary materials](#), Appendix B).

Although the teacher and the student responses in the pilot phase are overwhelmingly positive, areas of difficulty were cited by the teachers concerning their typical adaptation of materials for students with dyslexia. Moreover, students also suggested the following improvements for the app in open-ended questions and the most prevalent statements are provided here.

Tell us what you liked about the app?

- Development of stories and topics of social issues facing society today;
- the artwork of the comics; and
- multi-modal learning with art, text, and audio.

How do you think we can improve CIELL for other students?

- Add more tasks: level of difficulty, critical thinking, and add the full text to the infogram tasks;
- more stories: longer, more modern student-centred topics; and
- audio for all of the stories.

3.3. Cycle 3

The final evaluation was undertaken by a wider stakeholders' audience (N=122) which provided further insight into their perceptions, attitudes, and needs. The analysis of the data from the questionnaire provided further suggestions for changes to the app's third cycle of design, development, and evaluation: (1) all

stories received an audio version of the stories/essays, (2) two different levels of difficulty of the essays were provided, and (3) different task types were discussed and applied. These results led to a final and fourth version of the app.

4. Conclusions

Overall, 770 end-users contributed to the development of the CIELL app. The cyclical educational design research methodology enabled the research team to include feedback from stakeholders so that their perspectives and suggestions informed the development process, and their perceptions influenced the design and development of the mobile application, thereby maximising practical relevance. This meant that the final educational resource was more complex than initially planned and more fit for purpose. While the app was intended for the purpose of supporting the writing of essays for EFL students with dyslexia, teachers could also see its potential value in supporting listening, speaking, reading, and writing activities for all their EFL students.

5. Supplementary materials

<https://research-publishing.box.com/s/qg556ha1u4t8ouq4keu52yc4astax6p2>

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