

**A Children's Game to Improve Spelling**  
(Technical Paper)

**Digital Tools and Teachers' Workloads**  
(STS Paper)

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On my honor as a University Student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments

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## Prospectus

### **Introduction**

In recent years, there has been a growing influence of technology and gamification on education. Educational technology has supplemented classroom teaching by helping children learn easier, faster, and cheaper. Therefore, my technical project will focus on implementation of the game intended for kids to enhance their spelling comprehension.

Teachers' daily responsibilities can be quite stressful. Although digital technologies might help instructors with their responsibilities, they can also be used as an argument to allocate more students to them, undermining the potential gain. As a result, reducing teachers' heavy workloads is a sociotechnical challenge, not just a technical one. My sts paper will focus on how teachers may respond to the appearance of digital tools and how they may affect their daily workload in conventional classroom settings.

### **Technical project**

The purpose of this project is to design and implement a spelling game in order to facilitate spelling practice for children aged 5-7. To play this game, the device will show an object on the screen, as well as blank lines corresponding to how many letters are in the word. The user will have to find the correct letter blocks to spell the word and place the letter blocks onto the panel. When the user presses the “Check” button, the program will verify the spelling of the word and indicate whether the word is spelled correctly or not.

To our knowledge, this project is novel because it integrates physical letter blocks with gamification. Previous spelling games have existed fully in software as mobile or web

applications, like the app “EDUBUZZ” kids spelling game app. By incorporating physical letter blocks, this project also aids the development of fine motor skills and multisensory learning in children. Multisensory learning is a way for kids to engage multiple senses at once, thus improving the memory of the spelling. This method of learning is helpful for kids who learn differently. Children who struggle with visual processing would also struggle with a mobile app that teaches spelling visually. However, there have been some studies that compare multisensory approaches and conventional approaches for spelling that found there is not a significant difference in spelling performance but indicated more research had to be done to solidify this claim. We aim to build SpellCheck to further such research by proposing another method to practice spelling. Our project will utilize hands-on learning and gamification to engage kids to practice spelling in a less conventional way.

## **STS paper**

### **Digital Tools and Teachers’ Workloads**

*How have teachers responded to the proliferation of classroom technology?*

Digital tools can immerse the student in a subject, offer new means of instruction, and motivate learning. They can also be a practical help to teachers, especially by relieving heavy workloads. (Chang et al., 2006). While digital tools can relieve teachers’ workloads, they can also become pretexts for assigning teachers more students, thereby negating the benefit. Thus, diminishing teachers’ burdensome workloads is necessarily not merely a technical task but a sociotechnical problem. In higher education, the professional association representing teachers (professors) is the American Association of University Professors (AAUP). AAUP is a nonprofit professional association and advocacy representing faculty members and other academic

professionals. It defends academic freedom and advises institutions on educational standards. According to AAUP, the typical workload distribution among teachers in higher education is 40-40-20: 40 percent of a faculty member's time is spent on teaching, 40 percent on research, and 20 percent on service (AAUP, 1968). Yet actual practice varies widely. At research institutions, research may get a greater share of faculty members' time (Tomei, 2004). At other institutions, such as community colleges and colleges offering a liberal education program, teaching typically accounts for the great majority of faculty members' responsibilities. The workload is largely a function of course hours and enrollments per course (Mancing, 1999). Yet teachers' workloads cannot be determined with precision. Teachers grade papers, advise students, hold examinations, attend conferences, and engage in diverse projects that defy measurement. Digital tools and online instruction further complicate any such calculation (Mupinga & Maughan, 2008). Online learning, supported by new digital tools, has proliferated. Most teachers have easy access to vast online resources (Huang et al., 2010). The Covid-19 pandemic stimulated online instruction (Subedi et al., 2020). Online platforms such as Microsoft Teams, ZOOM, Google Classroom, Canvas, and Blackboard can serve as digital classrooms (Pokhrel, 2020). Some teachers record their lessons and upload them on YouTube, promoting discussions with teachers and peers (Doucet et al., 2020). The K-12 Teachers Alliance (KTA) offers TechHub.com, an online space by and for teachers which helps them find resources, connect, collaborate, and share ideas at no cost (KTA, 2021).

Researchers have found that Google Classroom may be the most common distance learning platform among teachers, though significant numbers use Seesaw, Microsoft Teams PowerSchool, or Canvas. Some use Blackboard, Schoology, and Moodle (An et al., 2021).

Yet there is no evidence that such tools have diminished teachers' workloads, which are still often excessive (See et al., 2020). English teacher Caitlyn Clayton of Farmington Central Junior High told a New York Times reporter about her heavy workload, teaching in hybrid mode during the pandemic. Ms. Clayton's workday begins in the classroom with in-person students; in the afternoon she begins the online section with remote students. She must repeat her in-person lessons to record instructional videos for remote students. "The days where it's 13-plus hours at school, you're just exhausted, hoping to make it to the car at night," said Clayton. "We're seeing an extreme level of teacher burnout" (Singer, 2020). Such workloads can diminish teachers' wellbeing. National Educational Association (NEA) reports that educators are working more hours than ever. NEA calls for equipment, training, and mandatory work breaks for teachers (NEA, 2020).

## **Conclusion**

The technical report will detail the ways for additional improvements to gain access for all students. Possibly, the project will be successfully integrated into schools' educational curriculums, thus, reducing the teachers' workloads and benefiting students' academic performance.

The STS research paper will examine the implementation of digital technologies and how it impacts various stakeholders, including teachers, students, educational institutions and government.

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