Technology-Based Grant Narrative for Memory and Cognition App: Quizlet

Wayne Beeman
Wilkes University
ED 5082

Abstract:
Students learn in a variety of ways through differing approaches with many strategies requiring cognitive ability. However, cognitive abilities among students differ widely involving issues with memory and thought development. Different cognitive level abilities among students in an educational setting poses challenging obstacles to their growth and for their teachers' planning efforts. However, with technologies, such as Quizlet, can improve student learning. By involving engaging and authentic situations learning with technology can solidify information recall while improving the overall environment and situation of all learners. The implementation of appropriate technologies fosters an atmosphere that is conducive to learning supporting the independence, innovation, and development of students while providing the versatility within a complex and differentiated education environment. The purpose of this grant narrative is to compose valuable information about memory and cognition impairments and the availability of assistive technology apps for students along with teacher supportive data. Incorporating a strong infrastructure to support the need and implementation for technologies to create learning opportunities, support, and tools that can help with learning educational material within a differentiated classroom ensuring the success of all learnings.

Resource Review of memory & cognition apps

According to Kaulina (20217), "Cognitive Development significantly influences efficiency and results of a child's understanding and comprehension of the world (Kaulina, 2017). Fostering an educational environment for all students is of high importance. Through technological innovations combined with best practices can achieve effective results to inform, deliver, and execute educational material that fosters learning and learning growth toward mastery, authenticity, and engaging results. The purpose of implementing such technology is for the intention of improving student learning, memory, reasoning, attention, and self-awareness in a differentiated classroom to support all learners. According to Katarzyna (2018) "[Cognitive] challenges are a leading cause of the urgent need to provide more people with access to the use of technology" (Katarzyna, 2018). However, implementing appropriate technologies that meet individual needs of students is challenging, but highly necessary.

Stakeholders in the educational world should be informed and knowledgeable in searching out assistive technologies that will improve student cognitive growth and sustainability of information. According to Kauliņa (2017), "Cognition is one of the most researched problems in psychology and pedagogy" (Kauliņa, 2017). This is difficult to evaluate due to the complexity of cognition and the various intricacies that effect each student differently due to trauma, development disorders, or brain damage. Commonly, students that have cognitive impairments have difficulty learning and are routinely slower than their peers with little to no gains in intelligence. Positively, implementing effective and appropriate technologies to better assists students with cognitive impairments can improve long term effects resulting in memory, recall, and cognitive development. Stevenson, Hedberg, Highfield, & Diao (2015) states. "In many K-12 and higher education contexts, the use of smart mobile devices increasingly affords learning experiences that are situated, authentic and connected" (Stevenson, Hedberg, Highfield, & Diao, 2015). Therefore, the implementation of appropriate technologies in effectives ways that are highly conducive to the educational goals, curriculum material, and mandated assessments can prove beneficial to students.

Stevenson, Hedberg, Highfield, & Diao (2015) states,

> "At the same time, as more mobile devices are used in classroom settings, the need to think beyond traditional print-based literacies is increasingly reflected in school curricula, teacher pedagogies and educational research. Learners now have a wider range of options for interacting with digital content, and the visual nature of many mobile apps and interfaces is playing a key role in extending the range of literacies being explored" (Stevenson, Hedberg, Highfield, & Diao, 2015).

With appropriate applications this statement can have effective results for struggling students with the fostering of personalization that meet educational and student goals amplified by the power of choice.

According to Wideman & Odrowsk (2012),

> "Allowing students to choose can be an effective method for students to demonstrate their learning, however, there are times when the purpose of the assignment is to challenge the student to go beyond their comfort zone and try something new in order to expand their abilities. An option is to provide, for example, four different types of assignments in the semester and students are required to complete three. Another example is having a test or exam that is divided into sections where each section has

different types of questions such as, multiple choice, short answer, case study, essay or sections to complete the test" (Wideman & Odrowsk, 2012).

An additional approach to best improve cognitive development among students with impairments is to provide feedback. Cayton-Hodges, Feng, & Pan (2015) states, "An essential condition for supporting student learning and improving chances of success is to provide feedback and scaffolding" (Cayton-Hodges, Feng, & Pan 2015). The necessity of feedback is to be relevant and timely for effective results that engage student in self-reflection and analytical cognition. Apps to improve cognition should reinforce content, procedures, and engagement with practice resulting in meaning through links, explanations, and generalizations. Kauliņa (2017) adds, "Cognitive development significantly influences efficiency and results of child's understanding and comprehension of the world. Attention and cognition play is a significant role to ensure academic achievement and success" (Kaulina, 2017). In a differentiated environment there are numerous challenges that educators face to best engage students to learn. Educators are needing to individualize student learning while maintaining an appropriate level of scaffolding that challenges students with a good amount of success, but not beyond attainability ending in negative results of failure. The need of assistive technology and its successful implementation resulting in differential ways that can meet student education needs in a variety of applications and educational settings to foster successful achievement among all students is critical. Hyden (2019), states, "Using the right apps can help students create an environment that is more conducive to their work style" Hyden (2019)

To assist stakeholders in the researching, retrieving, and implementation of appropriate technologies there are created frameworks such as the ADDIE Model and SETT Frameworks that assist with the implementation of technologies in an education setting. These frameworks help narrow the search field with defining questions and guidelines that can foster appropriate technologies best for students conducive to the educational environment. The SETT Framework, specifically, would be used during the intial piloting of ED Technology to gather data on exceptional students, but involving AT. According to Zabala (2002): The SETT Framework is an organizational tool to help collaborative teams create student-centered, environmentally useful, and tasks-focused tool systems that foster the educational success of students with disabilities (Zabala, 2002). The SETT Framework would provide the opportunity for users to engage in developing and creating effective applications of the AT/ED Technology in their own classrooms. Additionally, this approach will provide post support extending to parents to grow their understanding and effective use of the AT/ED Technologies to ensure the developmental growth of their child. Using the SATT Model will involve critical steps to ensure the success and longevity of technology implementation and use. It is important to note what Zabala (2002) states, "It is important to revisit the SETT Framework information periodically to determine if the information that is guiding decision-making and implementation is accurate, up to date, and clearly reflects the shared knowledge of all involved" (Zabala, 2002).

Description of the application with its advantages/disadvantages and teacher interview data on the need for a successful implementation.

One app in particular that provides an easy to use interface and multiple means of engagement with students while meeting the above researched based information is the paid version of Quizlet. Quizlet is multifunctional web-based study application that allows the user to set up a number of assessments or study tools to improve memory and cognitive skills without unnecessary adds interrupting activities. These assessments and study tools include flashcards,

spelling, tests, and matching. An added benefit is that students can create their own study tools to grow their understanding of teacher assigned content. Quizlet fosters educators versatility in a differentiated classroom to support all learners with its whole group and collaborative team approach flexibility to enhance learning requiring effort from all students. Another aspect of Quizlet is the audio functionality assisting students with hearing the sound of vocabulary words, terms, and definition. This provides an effective approach to developing proper sounding and articulation of words and phrases. Quizlet can also be effective in students learning a different language or assist ESL student in the learning process. According to Phelps, S. L. M. J., & Altabbakh (2018), "Many students struggle with learning facts, terms, or fundamental concepts; In some situations, students are even unsure about what they should study. Flashcards are a well-established educational aid for learning basic Information." (Phelps, S. L. M. J., & Altabbakh, 2018). Additionally, Quizlet provides analytics of student progress and growth to better assist struggling students while challenging students that excel. Quizlet offers customization of content to better engage students with visuals that can improve memory and cognitive skills in preparation of assessments. Quizlet is an assistive technology tool that can provide versatility for educators and curriculum content that reinforces key concepts with the flexibility to differentiate among student learning styles and abilities.

Advantages

Quizlet has an easy to use interface with navigation tools that can be easily accessed for optimal cognitive and memory engagements with a low investment. It offers versatility and differentiated study tools that support multiple ways of learning suited for a classroom of diverse learners. An educator can set up a Quizlet study tool and share a link with students. This link can easily be accessed anytime, anyplace, anywhere with a mobile device allowing students to engage in the content created by the teacher. There is potentially no limit to the type of questions created within the Quizlet application. The user (teacher or student) can create a variety of questions for a number of purposes based on user preferences fostering differential needs of learners. Quizlet also provides a platform that engages students to learn content at their own pace. Additionally, students can receive instant results to assessments gaining valuable feedback to solidify cognitive recall from the benefits of studying with Quizlet. This information can be valuable to educators for planning lessons, assessments, and necessary scaffolding.

Disadvantages

Quizlet possess a few disadvantages. The audio feature, though helpful, poses issues with phonics because of its robotic pronunciation of words are misunderstood such as the word "eight" sounds more like "aid." This poses problems when working with students on sight words or different language terms that require correct pronunciations. However, with the full paid version of Quizlet, the teacher can record his/her own voice to remedy the issue with the incorrect pronunciation of words. Additionally, content created by users may result in errors. The inputting of misspelled words or information may occur. This is one of the areas that pose problems for students that misspell a word or "hen pecks" using a keyboard preventing the answer to be accepted in a predetermined time limit. Quizlet requires the exact spelling of answers that have been inputted by the teacher or student prior to the execution of the activity. Quizlet, also, provides a number of limited features at no cost, but full features are unlocked with a minimal fee.

Sample Teacher Data:

At my school district I interviewed a number of educators and their classrooms containing mixed group of students with various levels of cognitive abilities. I was able retrieve valuable data for understanding the many ways to use and implement Quizlet within a differentiated classroom.

In a foreign language class, students are able to create or add to pre-generated flash cards to grow and develop understanding and recall of critical terms and words. Students can challenge themselves through a number of activities such as listening, reading, speaking and typing. The teacher can assign teacher made content or student made content as homework to involve differentiation and personalization. Also, the teacher can glean from Quizlet's progress tracking technology to better assist students and better execute classroom content.

Another educator uses Quizlet as an effective tool to build vocabulary words in language arts class. With its audio playback feature capability, users created content for their peers to foster personalized practice while engaging activities supporting various levels of difficulty to meet a variety of student development levels.

A math teacher enjoys the embedding of content into the school's learning management system to engage students. This supports the quick generating and delivery of classroom content that is easily accessed efficiently and conveniently for students. Students are able to keep track of the number of math problems they know with the possibility to review incorrect answers. This is reflective of the statement made by Bouck, Working, Bone (2018), "Mobile devices provide a valuable option to support students with disabilities in mathematics through app-based manipulatives" (Bouck, Working, Bone, 2018).

Interpretation of the Data and Research

The interpretation of data that was glean from observations and short conferences with teachers using Quizlet was positive. Each found the implementation of Quizlet to be engaging for students combined with goal settings to grow memory and cognition. They each saw improvements in growth in each student despite ability or impairment. This data was backed by informal and formal assessment made since the implementation of Quizlet in their classroom. Additionally, each teacher thought that the creation and sharing of Quizlet content was easily communicated either by creating a link on a teacher page or QR code (requiring a QR code reader) for students to conveniently access. This provided the benefit for students to access the link during class time or at home as an in-class activity or homework assignment. Teachers also are positive on the intuitiveness of the interface of Quizlet that can be navigated easily by students. The other benefit to using Quizlet is the involvement of multiple intelligences to more effectively differentiate among student needs. The activities in the classrooms supported Gardner's theory of multiple intelligences involving Quizlet on varying levels with high engagement among students. Students were excited, active, and mobile as they navigated between groups and assigned activities.

With implementation of any new technologies there are concerns. Any concerns over tech support availability for student mobile devices can be considered low at the Troy Area School District. Currently, Troy School District has in place a school wide 1:1 initiative of mobile device along with a strong infrastructure to support high volume of internet activity on a daily basis.

According to Kinber (2018),

> "In an effort to meet its growing educational and technology needs, Troy Area School District worked with the Keystone Initiative for Network Based Education and Research (KINBER) to become the first district in Pennsylvania to connect to PennREN, the high-performance Pennsylvania Research and Education Network, at 10 Gbps, providing the district's required network speed and capacity."

The IT team at Troy Area School District strives to build supportive technology tools to educate, develop, and sustain opportunities to grow skills, professional development, and higher learning for all stakeholders.

Conclusion

Quizlet provides Multiple Means of Action and Expression based on UDL. Students are able to engage and learn in multiple ways using Quizlet. Students are also able to create their own content in a number of ways that challenge and grow their cognitive understanding of information. Through Quizlet all students can be included at their level of understanding and ability. With the data results within Quizlet, students are able to retrieve necessary feedback to grow their learning resulting in evaluative methods.

Through apps like Quizlet students are able to customize their learning that is authentic while enhancing accountability and personalization while reinforcing collaboration. According to Stevenson, Hedberg, Highfield, & Diao (2015), "Rather than being the passive consumers of the pre-Internet age, learners are now able to employ the tools of professional composition to create, co-author and publish visual texts to reflect their world. As highly personal, portable connected, mobile devices play an integral role in shaping these emerging forms of literacy" (Stevenson, Hedberg, Highfield, & Diao, 2015). Ewoldt (2018) states, "These apps support students by directing focus to higher-order writing skills and supporting working memory deficits. Apps can be combined in a step-by-step process to meet a variety of objectives" (Ewoldt, 2018). As educators embarking on tomorrow's leaders in preparation to face imminent challenges with confidence, know how, and success, is vital that students have the cognitive growth necessary to achieve desired results. Through technology tools like Quizlet, students create their own learning to reach desired outcomes through multiple ways that best fit their learning styles and are conducive to their interests, dreams, and goals. In using tools such as Quizlet, teachers can engage students in a technological world so ubiquitous toward twenty-first century learning in preparation of a world that doesn't yet exist.

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