The Comparison of Two STEAM-Based Apps for Preschoolers

Child's Name

Institution

Introduction

Fostering young students' curiosity and enthusiasm for STEM subjects—science, technology, engineering, arts, and mathematics—is essential in early childhood education. Children between the ages of three and five need to be encouraged to be inquisitive and enthusiastic about studying STEM subjects. Because they pique children's interest in STEAM and foster their curiosity, technological applications are powerful tools for promoting play and inquiry-based learning. This study contrasts Toca Lab: Elements and Khan Academy Kids, two web applications that promote STEAM education for young children. Both applications emphasize play, problem-solving, and exploration, all in line with the Australian EYLF. This essay will focus on how each app has improved children's attitudes, excitement, and interest in STEAM-related topics.

The Applications

1. Toca Lab: Elements - https://tocaboca.com/apps

Toca Lab: Elements is an interactive app designed to teach children about the elements table while they play various science games. With the help of the software, children can manipulate components or heat or freeze objects in a virtual lab. As they understand key scientific concepts like density, conductivity, and matter states at first glance, this makes the teaching process more approachable for children. Although it is included in the software, chemistry is handled in a way that allows the children to experiment and have fun with the program. The interactive components lay the groundwork for early STEAM education and help the youngster easily grasp abstract concepts.

Toca Lab: Elements aims to ask the children questions by allowing them to speculate, research, and evaluate how elements behave. This applied curriculum develops early STEAM skills like asking questions and using reason. Unlike most didactic educational methods, this

software appeals to children's inherent curiosity about the workings of the natural world by allowing them to touch, move, and interact with the objects without dictating the end goal.

Because the learning environment used in this app is stimulating and interesting, it also promotes good attitudes toward learning. Children who play with these toys maintain their interest in and attention to science while developing a growth attitude. Since mistakes are seen as a necessary component of learning and help to build resilience and confidence, children are always corrected and given an apology when they make mistakes. Additionally, every element of the image has unique characteristics, and readers get curious as children wonder why those characteristics are assigned to those components. Toca Lab: Components Edutainment is a fun-filled setting that fosters admiration for STEAM disciplines by magically fusing learning and enjoyment.

App 2: Khan Academy Kids - https://play.google.com/store/apps/details?id=org.khanchildren.android&hl=en_AU

The educational program Khan Academy Kids App comes from the non-profit Khan Academy, which provides free educational materials. Experience and design principles about ECE learning philosophies are heavily included in the application (AGDE, 2022). Because of this, the application appears to be an essential part of the educational process for young students ages three to five. Although Khan Academy Kids was created with a worldwide user base in mind, it has been tailored to the Australian environment by offering a comprehensive array of early reading, arithmetic, creative, and logical reasoning-based activities that provide a well-rounded STEAM foundation. Therefore, the application was created with the EYLF and NQS learning frameworks in mind and Australia's criteria and expectations (EYLF, 2009).

In line with how the mind naturally learns, Khan Academy Kids aims to make difficult ideas simple, approachable, inductive, and accessible. Activities in the application appear to be based on both exploration and discovery. It has child-friendly content and uses colourful, amiable characters. The software encourages learning through play, making it suitable for young children. Math and logic puzzles, for instance, are entertaining because they allow children to practice number recognition and problem-solving without feeling like they are receiving instruction. With this kind of little diversion from the issue of real learning, the program finally achieves its objectives without appearing to be doing so.

Additionally, the app promotes inquiry-based learning by offering open-ended questions and allowing children to consider several answers. The application can accomplish the required objectives and provide a realistic environment for simulating the classroom experience. For instance, children can build critical thinking skills by practising pattern detection and problem-solving in many circumstances. It aids children in formulating hypotheses, testing them, and learning the hard way—all of which are essential elements of scientific endeavours. It aligns with the EYLF's goal of encouraging inquiry-based learning to advance cognitive growth (ACECQA, 2018). Therefore, the application satisfies the minimal standards for establishing a basic learning application for young Australian students.

Comparison of the Apps

Approach to STEAM Education

Toca Lab: Elements could effectively stimulate children's interest in the natural sciences because it is primarily positioned within scientific inquiry and hands-on experience. According to EYLF (2009), the app presents concepts such as states of matter, material qualities, and even the idea of a chemical reaction. It allows children to interact with elements

and create chemistry in a virtual sandbox. Young children's curiosity is stimulated, science education is made interesting, and sound scientific reasoning is encouraged.

Conversely, Khan Academy Kids App is a great tool for teaching children about technology and engineering since it concentrates on coding and problem-solving. With the help of a graphical user interface, children can comprehend how to move the Khan Academy Kids App across several grids and sequence the commands. This fosters the ability to think creatively about tangible logical ideas and numbers from programming and early childhood (ACARA, 2022).

Inquiry-Based Learning

Toca Lab: Elements encourages inquiry-based learning since it exposes children to potential hypotheses without expecting particular outcomes. With guidance and the chance to ask questions, make predictions, and conduct real science experiments, this somewhat general and, on the one hand, rather ambiguous approach can help children think at a higher level. The application encourages a genuine love of learning and lets children create strategies for understanding scientific ideas at their own pace.

On the other hand, Khan Academy Kids App encourages inquiry but is more regimented and concentrated on problem-solving and logical sequencing. This indicates that the task-driven nature of the app may limit the amount of free-roaming inquiry (ACARA, 2022). However, because children work methodically and use their critical thinking abilities to solve specific issues, this framework is suitable for fostering a computationally thinking learning process. Compared to the free-search assignment, the guided activities allow youngsters to learn programming basics while keeping their quest for answers inside a specified, still more controlled, procedure.

Play-Based Learning

Toca Lab: Elements uses an open-ended approach, allowing children to create various goals without specific ones while doing the exercise. This approach is creative, independent, and self-driven, all of which are encouraging traits of early STEAM education (ACECQA, 2020). Children's curiosity and involvement in learning about such occurrences are increased when the interface is enabled, allowing them to alter elements (ACARA, 2022). The simple encounter sparks interest in finding out more about specific phenomena.

However, with play as the main focus, Khan Academy Kids App aligns more with the program-bound learning approach. It outlines specific aims and objectives for each of its programs. Adhering to this framework can facilitate children's problem-solving abilities and educate them on goal-directed problem-solving. However, in terms of limiting creative exploration possibilities, this specific focus on achieving certain objectives may somewhat limit comparison with the open-ended research offered by Toca Lab.

Impact on Children's Dispositions for STEAM Learning

Curiosity and Interest

One of Toca Lab: Elements' highlights is its thrilling inability to dull the audience while motivating them to formulate inquiries on the events they have witnessed. Children can develop an interest in matter and energy via this investigation as they play with items. Additionally, the client's continual state encourages customizable controversiality; people can experiment without strict consequences and discover useful results intrinsic to their desire to learn more about science (ACECQA, 2020).

On the other hand, the Khan Academy Kids App performs exceptionally well in this criterion regarding logical reasoning and problem-solving despite its fairly structured learning methodology. The game lacks Toca Lab's curiosity about natural occurrences, even though children could be terrified of the results of their coding sequences. The assignments that are

practically focused and have defined objectives have a beneficial effect on the development of computing abilities (ACECQA, 2020).

Excitement and Engagement

Though in different ways, both apps aim to engage children. Toca Lab draws in young listeners: Elements' talented and amiable personalities, which aid in explaining complicated scientists. The ability of gross motor play to maintain children's attention due to its lack of rigid goals is one of its major benefits (ACECQA, 2020). Conversely, Khan Academy Kids App instils excitement in its operations and features reward schemes that promote learning in children. The app also has the benefit of having specific objectives that encourage children to persevere through tasks. The youngster is encouraged to strive harder and remain involved because the gory work is evident (ACARA, 2022).

Alignment with Early Years Learning Framework (EYLF)

The apps promote the following EYLF outcomes:

Outcome 4 - Children are confident and involved learners; and Outcome 5- Sequential: Children are good communicators: Both programs have interactive knowledge that allows the youngster to actively explore, solve problems, or participate in an activity. Khan Academy Kids App accomplishes this by heavily controlling the exploration to make it rational, whereas Toca Lab accomplishes this through unstructured exploration (EYLF, 2009).

Khan Academy Kids App enhances children's communication skills in idea sequencing and instruction by helping them think and explain their planning. Toca Lab encourages a somewhat more organic approach to learning than traditional teaching methods, letting children demonstrate to the educator—and thus to the observer—how they comprehend the elements and their responses (EYLF, 2009).

Recommendations for Educators and Parents

Khan Academy Kids App is an excellent tool for teaching children the fundamentals of programming in an enjoyable way. Educators may reinforce the concepts taught in the app's courses by including children in movement, such as using Khan Academy Kids App robots or coding mats, and help children develop their sequencing and problem-solving skills. Additionally, introducing increasingly difficult problems into lessons or introducing narrative elements into code problems helps generate fresh learning opportunities and maintain children's interest in the subject matter, giving coding a greater sense of purpose and assisting children in forming the skills they will need in the future (ACECQA, 2020).

Educators and parents can use Toca Lab as a bridge for scientific thinking within and outside the classroom. After the children have used the app, the educators can provide them with tangible manipulations that follow abstract ideas, enabling them to draw links between the app and science (ACARA, 2022). The method above also updates the lessons presented in the app, encouraging students to use critical thinking and problem-solving techniques (NQS, 2018). Therefore, strong ties between the online and offline realms can support instructors in enhancing science education for children and stoking the flames.

Conclusion

Khan Academy Kids App and Toca Lab: Elements are both appropriate educational apps for early childhood education, particularly for advancing STEAM education. In contrast to Toca Lab, which fosters scientific curiosity and inquiry, Khan Academy Kids App fosters problem-solving abilities and a clear grasp of code. By integrating these apps, parents and educators can create a more well-rounded approach to early childhood STEAM education while fostering children's interest in technology and physical science (NQS, 2018). The

EYLF supports using these applications for play- and inquiry-based learning since they help children develop into strong, driven learners.

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