The use of digital education for incarcerated students has been gaining traction in recent years. This systematic review examines the literature on technology-enhanced learning across a range of educational contexts. The review covers studies published from 2013 to 2023 and analyzes the impact of technology on student learning outcomes, engagement, and retention as well as acceptability of digital education for incarcerated students. The review revealed that digital education is still at the infancy as it is partly implemented in some prison without access to the internet. Also, the review highlights the potential of technology-enhanced learning to provide students with access to educational resources and opportunities that may not be available through traditional teaching methods. Additionally, the review identifies a range of factors that impact the effectiveness of technology-enhanced learning, including the quality of educational content, access to technology, and the support of teachers and peers. The review concludes that technology-enhanced learning has the potential to improve student outcomes across a range of educational contexts, but further research is needed to determine the most effective ways to implement technology-enhanced learning and ensure that all students have access to these resources.

KEYWORDS: Digital Education, Incarcerated Students, E-learning, Mobile Learning, Prison Education

1. INTRODUCTION

Digital innovation has impact on all aspect of life including teaching and learning. All sectors of the economy had been touched and this have changed the way we do things. During the era of face-to-face mode of teaching, teachers are always at the center of learning where all learning process are determined by the teacher. Today, things have changed with regards to how learning should occur, where learning will take place and those that will be involved in the learning process.

Technology has given us the opportunity to determine what to learn, where to learn, when to learn and how learning should take place. With this flexibility, technology has made learning easy, affordable, and available irrespective of geographical location and time zone. Technology has aided learning in a variety of ways which cannot be underestimated. Anyim (2018) opined that technology has made it easier for learners to access information from a wide range of sources, including the internet, digital libraries, and online databases. This has enabled students to research and learn about topics that may not be available in their local libraries or classrooms. Also, with the use of technology, teachers are able to provide personalized learning experiences to students based on their individual needs and learning styles (Chassignol et al., 2018).
This can be achieved through adaptive learning software, online tutoring, or learning management systems (Alam, 2022). Similarly, technology has made learning more interactive and engaging through the use of multimedia tools such as videos, animations, and simulations. These tools can help students visualize abstract concepts and make learning more fun and enjoyable. As stated by Pirdayanti et al. (2022), technology has made it easier for students to collaborate and communicate with each other and with their teachers, even when they are not in the same physical location. This can be achieved through online discussion forums, video conferencing, and messaging apps. It is worth noting that technological advancements have made it easier for teachers to analyze student learning and deliver feedback in real time. Online quizzes, automated grading, and digital feedback systems can help with this. Overall, technology has revolutionized the way we teach and learn, making education more accessible, engaging, and effective for students of all ages and backgrounds.

Despite these benefits, it is clear that not every learner can benefit from technology-enhanced learning for various reasons. Although, it may be difficult to say which learners may not benefit from technology-enhanced learning as it largely depends on the individual's learning style, preferences, and needs. However, some learners may face certain challenges with technology-enhanced learning, including learners who prefer face-to-face interaction, learners with limited access to technology such as those from remote and regional areas, learners who require individual attention, learners who have disabilities, learners who lack self-discipline, students from low social-economic background and learners who are not permitted to use technology for security reason (incarcerated students).

This paper is concerned about the last set of learners who are restricted to access technology-enhanced learning because of security. Incarcerated students are individuals who are currently serving time in a correctional facility or prison and are enrolled in an educational program. Some of these students are seeking to obtain a degree, vocational training programs, college courses or further their education while incarcerated. Incarcerated students face a number of challenges in pursuing education while incarcerated, including limited access to educational resources, a lack of technological infrastructure, and restrictive schedules. However, research suggests that education can be an effective tool for reducing recidivism and improving post-release outcomes, making it an important resource for incarcerated individuals (Ellison et al., 2018, Beaudry et al., 2021).

Also, this paper tends to look at various research done in favor of the use of technology enhanced learning for incarcerated students. With this systematic review, it will enable intending researcher(s) to know what has happened before, the present state of research in this area and the future. It will serve as a guide through that will equip researcher(s) with current trends in this area.

1.1 Technology-Enhanced Learning

Technology-enhanced learning (TEL) is a form of education that utilizes digital technologies to enhance the teaching and learning process (Hakami, 2023). It involves the use of various digital tools, resources, and platforms to support the delivery of educational content and provide students with new and innovative ways of learning. According to Rohio (2023), technology-enhanced learning has evolved into a discipline of study and practice focused on the use and assistance of information and communication technologies in teaching and learning. TEL can take many different forms, including online courses, e-learning modules, educational software and applications, gamification, virtual and augmented reality, and many more. These tools can be used to create interactive and engaging learning experiences, which can help students to develop new skills and knowledge.

One of the key benefits of TEL is its ability to provide students with more flexibility and accessibility in their learning. Online courses and e-learning modules, for example, can be accessed from anywhere, at any time, which can be particularly useful for students who cannot attend traditional classes due to work, family, or other commitments (Weldon et al., 2021). Also, TEL can provide teachers with new and innovative ways to engage with their students and to monitor their progress. Digital tools such as learning management systems (LMS), virtual classrooms, and online discussion forums, for example, can provide teachers with real-time
feedback on their students’ learning progress and help them to identify areas where they may need additional support. Technology-enhanced learning has the potential to revolutionize teaching and learning, by providing students with new and innovative ways of engaging with educational content and enabling them to develop the skills they need to succeed in an increasingly digital world.

1.1.1 Online Courses

An online course is a form of distance education that delivers educational content and instruction entirely over the internet. It is one of the numerous types of technology-enhanced learning. Online courses are often offered by educational institutions such as universities, colleges, and K-12 schools, as well as by private companies and organizations. Online courses typically use a learning management system (LMS) to deliver course materials, such as lectures, readings, assignments, and quizzes, and to facilitate communication between students and instructors. Students can access course materials and participate in discussions and assignments from any location with an internet connection, which makes online courses a flexible and convenient option for many learners.

Online courses have the flexibility of chosen either self-paced or instructor-led, depending on the course design. Some courses may include real-time virtual class sessions, while others may be entirely self-directed. Many online courses also include interactive multimedia content, such as videos, animations, and simulations, to help engage learners and enhance their understanding of course material. Aljawarneh (2020) opined that online courses can be a great option for students who require flexibility in their learning, or who are unable to attend traditional in-person classes due to work, family, or other commitments. As explained by Weldon et al., (2021), online course offers a flexible scheduling, time arrangements and cost-effective way to access educational content from top institutions around the world, regardless of where the student is located.

1.1.2 E-learning

E-learning, also known as electronic learning, is another form of education that uses digital technology to deliver educational content and instruction. E-learning can take many forms, including online courses, e-learning modules, webinars, virtual classrooms, and educational apps. E-learning can be delivered entirely online, or it can be combined with traditional in-person classroom instruction. E-learning materials may include multimedia content, such as video lectures, animations, simulations, and interactive quizzes, as well as digital texts and other materials. E-learning is often used in higher education and vocational training, but it is also becoming more common in K-12 education and informal learning contexts. E-learning is often a flexible and convenient option for learners who cannot attend traditional in-person classes due to work, family, or other commitments.

Hopkins and Farley (2015) investigated an Australian trial of mobile learning technology, including internet-independent eBook devices loaded with college preparation resources that tried to improve jailed students’ access to tertiary courses and pathways. While e-learning provides economic efficiency and flexibility for some, the authors discovered that the digital revolution may be diminishing chances for the most marginalized students, such as incarcerated students and other groups without direct internet access.

1.1.3 Learning Management Systems

A learning management system (LMS) is a software application used to manage and deliver educational courses and materials. It is typically used by educational institutions such as universities, colleges, K-12 schools, and corporate training departments, as well as by individual instructors and trainers. An LMS provides a central platform for instructors to deliver course materials, such as lectures, readings, assignments, and quizzes, and for students to access those materials and communicate with their instructors and classmates. It is a tool that can be used to track student progress, manage grades, and generate reports on student performance.

According to Farley and Pike (2016), engaging convicts in education is one of the approaches that could reduce security risks in prisons. One of the most difficult aspects of detention for convicts is boredom, which often leads to frustration and increases the danger of damage to staff and other prisoners. The
authors propose that if education were measured for its risk-reducing capacity, some of these issues may be mitigated. The authors emphasized that a number of programs in Australia and the United Kingdom have been done to integrate digital technology into prisons to give better access to self-paced higher levels of education, which could assist achieve the benefits of reduced risk and lower recidivism rates. LMSs can be self-hosted or cloud-based, and may offer a variety of pricing models, such as monthly or annual subscriptions. Some popular LMSs include Moodle, Blackboard, Canvas, and Schoology.

1.2 Motivation

Between 2000 and 2023, a span of approximately 23 years, researchers conducted several studies on technology-enhanced learning. Nevertheless, there are few systematic reviews on digital education for incarcerated students. This is insufficient and will not furnish any researcher with the required direction to understand the current level of research, where we are coming from, and where we are going in the future. As a result, it is necessary to undertake a comprehensive review on technology-enhanced learning for jailed students in order to give researchers with direction in this area.

1.3 Contribution

This systematic review has helped to inform the scientific community about the present status of research in technology-enhanced learning for incarcerated students.

2 RELATED WORKS

2.1 Review on Technology Education for Incarcerated Students

A number of research has been done to elucidate information on the extent to which education in prison has helped to curb recidivism. In the section, we consider some of the publications that gives insight into technology enhance learning.

In order to investigate the relationship between correctional education and decreases in recidivism, increases in employment after release from jail, and other outcomes, Davies (2013) performed a thorough literature review, which was followed by a meta-analysis. According to the study, getting correctional education while incarcerated lowers the likelihood that prisoners will commit crimes again and may increase their chances of finding employment once they are released.

Davis et al. (2014) conducted an empirical research study that examine the effect of correctional education programs on the three outcomes of interest—recidivism, postrelease employment, and reading and math scores. This search yielded 1,112 documents, of which 267 were identified as primary empirical studies. To be in our meta-analysis, the study needed to meet three eligibility criteria: (1) evaluate an eligible intervention, defined here as an educational program administered in a jail or prison in the United States published (or released) between January 1, 1980, and December 31, 2011; (2) measure the effectiveness of the program using an eligible outcome measure, which include recidivism, postrelease employment, and achievement test scores; and (3) have an eligible research design, which, for this purpose, is one where there is a treatment group comprising inmates who participated in or completed the correctional education program and a comparison group of inmates who did not. Out of the 267 primary empirical studies, 58 met all three eligibility criteria. With respect to recidivism, based on the higher-quality research studies, the authors established that, on average, inmates who participated in correctional education programs had a 43 percent lower odds of recidivating than inmates who did not, thus indicating that correctional education is an effective strategy for reducing recidivism.

This estimate is based only on 9 effect sizes from studies that met higher levels of rigor (i.e., earned 4s or 5s on the Maryland Scientific Methods Scale), but the results were very similar even when the lower-quality studies were included in the analysis. This translates to a reduction in the risk of recidivating of 13 percentage points for those who participated in correctional education programs versus those who did not. When aggregating across 18 studies that used employment as an outcome, the authors observed that the odds of obtaining employment postrelease among inmates who participated in correctional education
(either academic or vocational/CTE programs) were 13 percent higher than the odds for those who did not. However, the findings are only suggestive about whether correctional education is an effective strategy in improving postrelease employment outcomes because only one of the 18 studies were of higher quality (level 4 or higher), thus limiting our ability to make a more definitive statement. When aggregating across four studies that used achievement test scores as an outcome, it was established that learning gains in both reading and in math among inmates exposed to computer-assisted instruction were similar to learning gains made by inmates taught through traditional (face-to-face) instruction methods.

A thorough investigation was conducted by Davis et al. (2014) to evaluate the efficacy of education for pupils who are incarcerated. According to the authors, there are more than 2 million individuals incarcerated in US prisons, and every year, over 700,000 people are released from federal and state prisons and go back to their communities. The author noted that 40% of people will be behind bars again in three years. They claim that one reason for this is that ex-offenders lack the education, experience, and abilities necessary to support an effective return to society. According to their study, states should spend money on inmate education and training in order to lower the rate of recidivism. The authors made an effort to determine the cost- and effect-effectiveness of correctional instruction.

Specifically looking at European jail inmates, Monteiro et al. (2015) did a review to determine the potential of e-learning in supporting the digital inclusion of adults who are experiencing social exclusion. It concentrates on the ideas of digital inclusion, lifelong learning, and literacy in the digital age from a theoretical standpoint. In order to identify the challenges and opportunities of e-learning in this setting as a way of digital inclusion, European projects of e-learning in prisons were examined from a methodological point of view. The main obstacles are connected to concerns with security, accessibility, upkeep of technological equipment, and people’s motivation to engage in learning activities throughout their lives. E-promise learning’s is associated with expanding learning opportunities, a variety of resource options, and the ability for personalization and teamwork.

A meta-analysis of 18 studies that were relevant to educational interventions used in juvenile detention facilities was conducted by Steele et al. (2016). The investigations cover five types of interventions: academic remediation, computer-assisted learning, individualized learning, vocational training, and GED completion. Four outcomes—academic success in reading or mathematics, diploma completion, post-release employment, and post-release recidivism—are used by the authors to assess effectiveness in their research. According to their findings, computer-assisted teaching has a positive and statistically significant impact on reading comprehension, and personalized learning has a positive impact on diploma completion and post-release employment. Large, well-conducted randomized trials of the Read 180 program by Scholastic and the Avon Park Youth Academy in Florida served as the basis for these results.

In order to evaluate the effectiveness of educational programs offered inside prisons, Ellison et al. (2017) performed a Rapid Evidence Assessment (REA). The review included assessments of the educational programs offered in prison, including those for vocational, academic, basic skills, accredited, and unaccredited programs, where recidivism and/or job results were tracked. Initial searches by the writers produced 4304 titles and abstracts. Out of these, 28 articles were eligible for inclusion. To be included in the meta-analysis, only 18 papers offered enough data and a solid enough study design. The provision of schooling in prison settings has a favorable effect on recidivism, according to a Meta-analysis of 18 reoffending studies. The overall pooled odds ratio (0.64 = 64%/23) shows a reduction in the probability of recidivism of about one-third. The authors also stated that a meta-analysis of five job studies revealed that education in incarceration settings has a favorable effect on employment. Overall odds ratios showed that participating in prison education increases a prisoner’s chance of finding work by 24%. This, however, is founded on a small number of papers with less reliable statistical findings and evidence primarily from the USA. In order to clarify data on the connection between education obtained while incarcerated and risks of recidivism and enhance postrelease job prospects, Bozick et al. (2018) performed a thorough meta-analysis. The authors combined 37 years of study on correctional education (1980–2017) and used meta-analytic methods. The authors found 21 studies that used work as an outcome and a total of 57 studies that used recidivism as an outcome. According to the
results of the studies, prisoners who took part in correctional education initiatives had a 28% lower chance of recidivism than prisoners who did not. Additionally, the outcome demonstrates that prisoners who received correctional education had an equal likelihood of finding work after their release as prisoners who did not receive such education. In conclusion, the authors showed the importance of offering inmates educational chances while they are serving their sentences if the program’s aim is to lower recidivism.

The European Framework of Reference has identified digital literacy as one of the fundamental skills for lifelong learning. This has recently taken on more significance in academic papers, studies, and the international policy agenda. Even though adult education delivered through a virtual environment may present a chance for digital inclusion and knowledge acquisition, there are some situations where involvement, usage, and access are severely restricted or even prohibited. One of those settings is a prison. Barros et al. (2021) conducted a literature study using the keywords education, prison, and technology in order to map trends in academic research regarding Adult Learning supported by digital tools in prisons. It is interesting to know that the analysis of the 20 identified articles provided insights into the emergence of prison education resources, learning outcomes, educational staff, and cultural aspects and policies. The fact that these studies have a worldwide representation, with a strong focus on Europe, indicates the growing interest in prison education and its importance in promoting rehabilitation and reducing recidivism rates.

Drane et al. (2021) provided a scoping review on the approaches taken to manage unanticipated school closures due to COVID-19. The review’s findings highlight the different approaches taken by countries regarding school closures and the potential consequences of full closures for students from disadvantaged backgrounds. The review’s analysis of the long-term educational impacts of navigating the COVID-19 disruption emphasizes the importance of targeted support for vulnerable students to ensure they do not experience persistent disadvantage. This includes addressing barriers such as digital exclusion and poor technology management, as well as providing psychosocial support to students facing increased challenges. Overall, the scoping review provides valuable insights into the educational issues faced by young people during the pandemic and emphasizes the need for targeted support to ensure that all students can continue to learn and succeed despite the challenges posed by the pandemic.

In order to shed light on the degree to which digital rehabilitation of offenders ensures successful re-entry and improves post-prison life in a digitalized society, Zivanai and Mahlangu (2022) performed a systematic review. Successful re-entry, post-prison life, and the digital society were the three areas of digital jail rehabilitation that the authors looked into using the Good Lives Model and the Critical Theory Approach. The research found that the majority of prison rehabilitation practices and policies are still implemented in-person and do not take into account the internet. The authors concluded by saying that, in a technologically advanced society, the use of digital rehabilitation could guarantee a smooth transition out of prison and an improved quality of life once released.

As the popularity of online learning delivery continues to increase, the study by Renee’ Chambers (2022) investigated the experiences of online correctional education instructors who teach English composition. The study used a qualitative approach, specifically a transcendental phenomenology methodology, and aimed to identify the instructors’ pedagogical strategies, methods of cultivating relationships with students, and areas of needed professional development and support. The study’s findings indicated that online correctional education instructors modified their teaching practices to suit the online modality, particularly with regards to providing feedback and the focus of their writing instruction. Instructors also noted the importance of tone and consistent encouragement when communicating with incarcerated students. However, they also faced challenges in forming relationships with students in the online environment. Regarding professional development, the instructors highlighted the need for more training in technology, cultural sensitivity, and forming professional bonds with fellow instructors. The study’s insights can be used by correctional education program directors and administrators to enhance their programs and provide better support for instructors and students. Also, the findings of this study provide valuable insights into the experiences of online correctional education instructors and can guide the development of effective practices and support structures in this field.
Table 1: Summary of Reviewed Literature on

<table>
<thead>
<tr>
<th>SN</th>
<th>Author</th>
<th>Year</th>
<th>Ref</th>
<th>Review Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Davis LM, Bozick R, Steele JL, Saunders J, Miles JN</td>
<td>2013</td>
<td>686</td>
<td>Sys</td>
</tr>
<tr>
<td>2</td>
<td>Davis, L. M., Steele, J. L., Bozick, R., Williams, M. V., Turner, S., Miles, J. N., &amp; Steinberg, P. S.</td>
<td>2014</td>
<td>215</td>
<td>Uns</td>
</tr>
<tr>
<td>3</td>
<td>Monteiro, A., Barros, R., &amp; Leite, C.</td>
<td>2015</td>
<td>29</td>
<td>Uns</td>
</tr>
<tr>
<td>4</td>
<td>Steele, J. L., Bozick, R., &amp; Davis, L. M.</td>
<td>2016</td>
<td>36</td>
<td>Meta</td>
</tr>
<tr>
<td>5</td>
<td>Ellison, M., Szifris, K., Horan, R., &amp; Fox, C.</td>
<td>2017</td>
<td>102</td>
<td>Uns</td>
</tr>
<tr>
<td>6</td>
<td>Bozick, R., Steele, J., Davis, L., &amp; Turner, S.</td>
<td>2018</td>
<td>131</td>
<td>Meta</td>
</tr>
<tr>
<td>7</td>
<td>Barros, Rita Manuela, Angélica Monteiro, and Carlinda Leite</td>
<td>2021</td>
<td>2</td>
<td>Sys</td>
</tr>
<tr>
<td>8</td>
<td>Drane, C. F., Vernon, L., &amp; O’Shea, S.</td>
<td>2021</td>
<td>82</td>
<td>Scop</td>
</tr>
<tr>
<td>9</td>
<td>Zivanai, E., &amp; Mahlangu, G.</td>
<td>2022</td>
<td>0</td>
<td>Sys</td>
</tr>
</tbody>
</table>

3. METHODOLOGY

According to Imam et al. (2021), a well-designed survey includes a thorough study of all existing studies on the subject or area of interest. A methodical assessment of the literature seeks to provide insight into a comprehensive examination of current existing literature relevant to a wide range of problem formulations (Murti et al, 2021). Scopus, ERIC (Education Resources Information Center), JSTOR (Journal Storage), ProQuest, Sage Journals Online, Taylor & Francis Online, SpringerLink, ScienceDirect, Wiley Online Library, PsycINFO and Microsoft Academy were all searched extensively in order to perform this research. Also, the following steps were followed (figure 1):

1. Define the research question: For a successful systematic review, we defined three research questions.
2. Develop a search strategy: We carefully choose our keywords for inclusion criteria as well as having a well-defined exclusion criterion. Some potential keywords and search terms for this topic include "digital technology education," "incarcerated students," "prison education," "e-learning," "distance education," "online learning," and "technology in education."
3. Conduct the search: We proceed to use the inclusion and exclusion criteria to search for precise and relevant studies.
4. Select the studies: After the search has been conducted, we screened the studies for relevance. This involves reading the titles and abstracts of the identified studies to determine if they meet the inclusion criteria.
5. Evaluate the quality of the studies: After selecting the relevant studies, we evaluated the quality of the studies. This involves assessing the methodology, sample size, and validity of the studies.
6. Synthesize the results: Finally, the results of the selected studies were synthesized. This involves summarizing the findings of each study and identifying common themes and patterns.
7. Interpret the results: The synthesized results were interpreted to answer the research question.
8. Communicate the findings: Finally, we communicate our findings of the systematic review.
3.1 Research Question

To gather data from the literature, the following research questions were developed:

RQ1 Is digital education permitted for incarcerated students?

RQ2 How is digital education implemented in the Prison?

RQ3 What are the effects of digital education on incarcerated students?

3.1 Search Database

In order to get a comprehensive list of studies conducted on technology enhanced learning for incarcerated students, the following databases were thoroughly searched:

Scopus, ERIC (Education Resources Information Center), JSTOR (Journal Storage), ProQuest,
Sage Journals Online, Taylor & Francis Online, SpringerLink, ScienceDirect, Wiley Online Library,
PsycINFO, Academic Search Complete.

3.2 Search Process

The online database libraries are not enough if an improper search strategy is applied. Suitable terminologies that would help in solving the research questions should be utilized to solve the central concern, that is, digital education among the incarcerated. In the current systematic review, the Boolean Operators “AND” and “OR” are applicable in finding the right articles. The following examples depict the search for sources reviewed:
“digital education” AND “incarcerated students”
“digital education” AND “prisons”
“digital education” OR “effects of digital education” AND “incarcerated students”

With thousands of articles at our disposal, utilizing such terminologies in the research helps to narrow down the specific articles to be selected before being subjected to data synthesis phase (figure 2).

Figure 2: Study Selection

**Inclusion and Exclusion Criteria**

Table 1 indicates the inclusion and exclusion criteria used in further selection of articles for analysis.

<table>
<thead>
<tr>
<th>Inclusion Criteria</th>
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</thead>
<tbody>
<tr>
<td>The articles must have been published in the English Language</td>
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<tr>
<td>Articles discussing digital education in prisons</td>
</tr>
<tr>
<td>Articles discussing effects of digital education among the incarcerated</td>
</tr>
<tr>
<td>Articles published between 2013 to 2023</td>
</tr>
<tr>
<td>Articles that align to the research questions</td>
</tr>
</tbody>
</table>

**Data Extraction and Quality Assessment**

The current systematic review was guided by the quality assessment list during data extraction as provided by Hussein et al. (2018). Relying on such an assessment list ensured that the study picked studies that had complete structure of a scholarly work.
Figure 3: Assessment check list

Findings

The total result we get before these exclusion criteria was formulated is 42,000 relevant papers. These criteria are used to ensure that the study results are as accurate and reliable as possible by excluding participants who may confound or bias the results. We exclude those materials that are older than 10 years (i.e. papers before 2013 were discarded), the result from this gives us 17,111 papers. We remove publications that are not written in English, this reduced the result to 12,800.

Also, we excluded those papers that has only the abstract. These categories of papers did not give us permission to the full paper, the remaining papers were 10,005. Similarly, we remove duplicates papers from the result and the resultant was 905 papers. After removing these papers, we were left with 16 papers. Our research was based on the remaining 16 papers.

Table 2: Selecting Articles

<table>
<thead>
<tr>
<th>Scopus</th>
<th>ERIC</th>
<th>1245</th>
<th>5001</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rejection based on year of publication=24889</td>
<td>Non English Articles =5200</td>
<td>Premium Articles=2795</td>
<td>Duplicates=9100</td>
</tr>
<tr>
<td>Selected=16</td>
<td>Reject</td>
<td>Select</td>
<td></td>
</tr>
</tbody>
</table>

Quality Factors

From the quality assessment, the following table showcases the performance of the articles selected for final review:

<table>
<thead>
<tr>
<th>Quality Scale</th>
<th>Very Poor (&gt;=1)</th>
<th>Poor (&gt;=2)</th>
<th>Fair (&gt;=3)</th>
<th>Good (&gt;=4)</th>
<th>Very Good (&gt;=5)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Studies</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>3</td>
<td>10</td>
<td>16</td>
</tr>
<tr>
<td>Percentage</td>
<td>0%</td>
<td>0%</td>
<td>23%</td>
<td>23%</td>
<td>54%</td>
<td>100%</td>
</tr>
</tbody>
</table>

4 DISCUSSION
Is digital education permitted for incarcerated students?

At this section, we look at various research that explore the acceptability or permission of digital education in prison and the extent of the permission/acceptability. Digital education refers to the use of technology and digital media in the teaching and learning process. It includes various forms of online learning, such as e-learning, virtual classrooms, blended learning, and online courses. Digital education has become increasingly popular in recent years, as technology has become more accessible and affordable. It has opened up new opportunities for students and teachers to connect and engage with learning materials in ways that were previously not possible. Advantages of digital education include increased access to education, flexibility in scheduling and pacing, personalized learning experiences, and the ability to incorporate multimedia and interactive resources into lessons. However, it also presents challenges, such as the need for reliable internet access, technological literacy, and the potential for increased isolation and lack of social interaction.

A number of research conclude that the rate of recidivism will continue to grow except incarcerated persons are allowed to learn one trade or the other while in prison. Majority of these researchers suggest that recidivism will be reduced if incarcerated person could be permitted to undergo formal education so as to help them secure job after they have been released to the society.

In their 2013 paper, Champion and Edgar discuss the potential benefits of using information and communication technologies (ICT) in prisons, particularly in the areas of education, resettlement, and family connections. They note that the Prisoners Education Trust and the Prison Reform Trust have worked together to explore ways in which ICT can be employed more effectively in prisons, with the goal of reducing recidivism rates. The authors argue that providing access to educational and vocational training programs through ICT can help prisoners develop skills and knowledge that may reduce their likelihood of reoffending upon release. Additionally, they suggest that using ICT to maintain connections with family members can provide social support and help to reduce feelings of isolation and disconnection that can contribute to recidivism. Overall, Champion and Edgar suggest that leveraging the potential of ICT in prisons may be an effective strategy for reducing reoffending rates and improving outcomes for prisoners.

Seelig and Rate (2014) presented the report of their investigation on the barrier confronting the use of digital and online tools in remote learning to improve the literacy and numeracy of New Zealand prison inmates. Following discovery of problem mitigating against digital education for incarcerated students, the authors advised that Open Polytechnic, in collaboration with the New Zealand Government, should consider the implementation of digital education for prisoners in order to give them more opportunities for rehabilitation, and ultimately prepare them for re-entry into society, the workforce, or further study, by looking at the benefits and limitations of digital education within the prison environment.

While jailed students have always encountered numerous barriers to full and effective involvement in university studies, the major trend toward paperless e-learning settings had also presented fresh obstacles for prisoners who do not have direct internet access. Hopkins and Farley (2014) examined the outcomes, limitations, and difficulties of recent Australian projects testing novel internet-independent technologies created to improve incarcerated tertiary students’ access. The authors argued that that technology-centered approaches by themselves will not be sufficient to handle the issues of access for students who are incarcerated unless such initiatives are also guided by a knowledge of the sociocultural nature of teaching and learning within prison systems. Incarcerated students are faced with challenges of being excluded in the digital education due to the cost involved, inability to access the broadband or prohibition from accessing the internet due to security of the prison environment (Hopkins and Farley, 2014).

As part of the efforts to solve these problems, Farley (2015 B) described four projects that attempt to surmount these difficulties by utilizing eBook readers and tablet computers, as well as creating and testing a viable and creative learning management system (LMS) called Stand-Alone Moodle (SAM) for use by incarcerated students. These technologies allow institutions to provide comparable course materials, activities, and support to these students as they do to traditional students, thus further enhancing the standard of the student learning experience. These technologies were tested in a number of Queensland correctional facilities.
and assessed using a design-based research method. The project’s results and suggestions are being shared to institutions of learning and correctional facilities across Australia in order to promote equal educational opportunities for disadvantaged students.

As universities become more dependent on online course and program delivery, those without reliable internet or those that are prevented for the use of internet for learning purpose become increasingly marginalized. Farley (2015 A) explained a Higher Education Participation and Partnership Program (HEPPPP) project called Making the Connection, which allows incarcerated students, especially Indigenous students, who do not have internet access to engage in university programs using an internet-independent version of USQ’s learning management system and tablet computers. Farley (2015 A) explained further that the technologies, processes, and materials created in this initiative will be used in the future to give digital access to university courses for any student who does not have internet access.

Jewkes and Reisdorf’s (2016) research highlights the digital disparities that inmates face and the potential benefits of providing them with access to new media for their rehabilitation and reintegration into society. The authors argue that denying prisoners access to the internet and social media results in severe social isolation, making them one of the most technologically backward groups in society. Access to information and communication technologies is often viewed as a luxury in prison, and prison officers use it as a tool to exercise soft power over inmates. However, denying prisoners access to these technologies may compound the challenges they face when reentering society after serving their sentences. Ex-offenders already face prejudice and limited job prospects due to their criminal record, and their lack of digital skills may further exacerbate their social exclusion. The authors suggest that providing prisoners with access to new media may help reduce their social isolation and improve their chances of successful reintegration into society. By developing digital skills and engaging with social media, prisoners can establish connections with the outside world, access educational and employment opportunities, and develop the skills necessary to succeed in the digital economy. Jewkes and Reisdorf’s research highlights the importance of addressing the digital disparities that inmates face and recognizing the potential benefits of providing them with access to new media for their rehabilitation and reintegration into society.

In research carried out by Farley and Pike (2016), the authors asserted that engaging prisoners in education has been identified as a potential solution to alleviate security risks in prisons. They emphasized that incarceration often leads to monotony, which can result in frustration, aggression, and increased risk of injury for staff and other prisoners. By promoting critical thinking skills, education may reduce re-offending rates and help prisoners transition back into society. However, accessing higher levels of education in prisons poses several challenges. These include limited access to resources, a lack of qualified instructors, and restrictions on internet and technology access. Additionally, prison budgets may prioritize security measures over educational programs. To overcome these challenges, it is necessary to recognize education’s potential in reducing security risks and to measure it accordingly. This could involve reallocating resources from security measures to education programs, prioritizing educational resources and instructors, and allowing greater access to technology and the internet. According to Farley and Pike (2016), several projects in Australia and the UK have introduced digital technologies into prisons to provide self-paced education opportunities for prisoners. These technologies include mobile learning devices and virtual classrooms, allowing prisoners to access educational resources remotely. Such initiatives have shown promise in reducing recidivism rates and promoting positive outcomes for prisoners.

Farley and Pike (2016) argue that educating prisoners can reduce the risk to prison security by addressing the problem of boredom and dissatisfaction among inmates. They suggest that providing educational opportunities can foster critical thinking skills and reduce the likelihood of recidivism. The authors acknowledged the challenges that higher education in prisons faces, including limited resources and support, but they argue that valuing education for its potential to lower risk and evaluating it accordingly could help overcome these obstacles. Farley and Pike highlight initiatives in Australia and the UK that use digital technology to provide self-paced education to inmates. These initiatives have the potential to improve access to education and reduce recidivism rates. The authors argue that investing in prisoner education can have
significant benefits for prison security and reducing recidivism rates. By addressing the problem of boredom and providing opportunities for personal growth and development, educational programs can help prepare prisoners for successful reintegration into society.

Similarly, Van De Steene and Knight (2017) argued that the digital transformation is inevitable and will have a significant impact on how justice is administered and experienced. They suggest that the criminal justice system needs to embrace this digital revolution and make the necessary changes to integrate digital tools into their operations. The authors identify several crucial factors for prison-related digital transformation, including the need to prioritize the safety of staff and inmates, as well as the need to put the end-user at the center of the change. They acknowledge that there are some modest but promising efforts in many jurisdictions, but important obstacles remain in integrating digital tools for use by staff and inmates. Van De Steene and Knight stress the importance of developing digital offerings that are designed to meet the needs of the end-user. They argue that this approach will lead to more effective and efficient services and a better experience for both staff and inmates. Overall, the authors believe that embracing the digital transformation in the criminal justice system is necessary for progress and will require a commitment to putting the end-user at the center of change. By prioritizing safety and designing digital tools that meet the needs of staff and inmates, prison organizations can improve their operations and provide better services.

Bradley and Davies (2021) conducted a study to investigate the impact of the Covid-19 pandemic on the quality of education in prisons. The study reveals that the Her Majesty’s Prison Service has adopted a restrictive approach during this challenging time, and education for prisoners has not been given the priority it deserves. The authors also highlight the digital gap in prisons, which has been exacerbated by the pandemic. Many prisoners lack access to technological resources that could enhance their learning experience, such as online learning platforms, digital libraries, and educational software. This lack of access has further hindered the continuity of education for prisoners. In-cell learning, which refers to the provision of educational resources within a prisoner’s cell, has also been affected by the pandemic. The study shows that the pandemic has revealed the lack of technological progress in this area. Many prisoners still rely on outdated methods of learning, such as textbooks and worksheets, which are often limited in availability and scope. The authors argue that the digital gap in prisons needs to be addressed urgently to improve the quality of education for prisoners. They suggest that the government should invest in providing technological resources to prisoners and improving in-cell learning opportunities. This investment could help to bridge the digital divide and ensure that all prisoners have equal access to educational resources.

Conclusively, Bradley and Davies (2021) highlight the need for urgent action to improve the quality of education in prisons during the pandemic. The digital gap in prisons needs to be addressed, and technological resources should be made available to prisoners to enhance their learning experience. The government needs to prioritize prisoner education and invest in improving in-cell learning opportunities to ensure that prisoners have access to high-quality education.

How is digital education implemented in the Prison?

A number of projects has been initiated and implemented towards eradicating digital divide amongst the incarcerated students, we present the few of those projects as related to education for incarcerated students.

Stand Alone Moodle (SAM)

Moodle is an open-source learning management system (LMS) that allows educators to create online courses and manage learning activities. A stand-alone Moodle installation refers to a Moodle installation that is not integrated with any other system or platform. By the end of 2012, a project team was awarded a $AUD 217,000 funding from the Australian government’s Office for Learning and Teaching Innovation and Development to further develop Stand Alone Moodle (Farley & Doyle, 2014). In the PLEIADES new initiative, it took two USQ ICT Services workers a day to deploy the server software, the most recent instance of Moodle, and the TPP7120 course on the correctional Center education server. This was deemed unrealistic if SAM was to be expanded to other correctional facilities in the future. The goal of “From Access to Success” was to automate most of the server software, Moodle instance, and course installation. SAM
can be installed from a DVD, and the course instance can be uploaded from another DVD. Correctional center education personnel can easily uninstall the previous semester’s course, update SAM, and install the new course from the DVDs by following a few basic instructions. This process takes roughly thirty minutes, which is a major improvement over the time it takes USQ ICT workers to accomplish the duties in situ.

The Triple “E” Project

The OAC initiated a project called Triple "E" Initiative (for Empowerment, eLearning, and E-Readers). The Project is an initiative that aims to empower people through e-learning and e-readers (Farley & Doyle, 2014). Triple “E” project aims to bridge the digital divide and provide access to educational resources and opportunities for those who may not have had access to them before. The project typically involves the distribution of e-readers loaded with educational content and resources, as well as providing training and support to help individuals learn how to use the devices and access the materials. The e-readers often have features such as text-to-speech, which can help those who struggle with traditional reading to access information in a more accessible format.

The Triple "E" Project can have a significant impact on individuals and communities, particularly those in underserved areas. By providing access to educational resources, individuals can improve their knowledge and skills, which can lead to improved economic opportunities and quality of life. The project can also help to promote literacy and lifelong learning, which are essential for personal and professional development. This model did not have an Internet connection, an integrated battery, or an SD card port. The project team discovered that filling the SD card slots with "builder’s bog" was the most efficient technique of disabling them after some experimentation. Even after digging out the "muck" with a sharp tool, the SD card port remained inoperable (Farley & Doyle, 2014). Course readings, module guides, and the course introductory book were once again converted to ePub format, checked for copyright compliance, and loaded onto eBook readers.

The PLEIADES pilot project:

According to Farley & Doyle (2014), Portable Learning Environments for Incarcerated Adult Distance Education Students (PLEIADES) is a distance education program that provides incarcerated adults with access to higher education through portable, technology-enhanced learning environments. In 2012, the initiative operated during semesters 2 and 3 (see figure 1). The project used a version of USQ’s Study Desk that was placed directly on the correctional center’s education server and did not require Internet connectivity. To make SAM work, course materials required to be integrated with the course rather than available through the Equella repository at USQ. Incarcerated pupils could use the correctional center computer lab to access SAM. The lab housed ten blade PCs that were controlled by the server. Reading resources available on eBook readers augmented the SAM contents. The eBook readers are expected to meet certain security compliance standards for QCS. They couldn’t connect to the Internet, had to have built-in batteries that couldn’t be removed, and couldn’t have SD card slots.

The project team found Sony PRS350s that met these specifications. These eBook readers were regarded obsolete even at the time of purchase. The project “PLEIADES” was implemented at Southern Queensland Correctional Complex (SQCC), an all-male, high-security correctional facility run by Serco Asia Pacific, as a PLEIADES pilot project. SQCC is located near the small township of Gatton and is approximately 45 minutes from USQ’s Toowoomba campus.
The PLEIADES program was developed by the University of Southern Maine in partnership with the Maine Department of Corrections and other organizations. The program uses portable laptops equipped with software and other tools necessary for distance learning, such as access to online course materials, video conferencing capabilities, and e-books. The laptops are used in secure facilities such as prisons and jails to provide incarcerated students with access to education and training opportunities that they might not otherwise have. The PLEIADES program offers a variety of courses and programs in areas such as liberal arts, business, and social work. The program has been recognized for its success in increasing educational opportunities and reducing recidivism rates among incarcerated adults. The program has also been recognized for its innovative use of technology to deliver education in a non-traditional setting.

The PLEIADES program is an example of how technology can be used to provide educational opportunities to marginalized populations. It is designed to help incarcerated adults improve their skills and knowledge, which can lead to better job prospects and reduced recidivism rates. By providing incarcerated individuals with access to higher education, the PLEIADES program aims to break the cycle of poverty and incarceration and promote positive social and economic outcomes.

Hämeenlinna Smart Prison

According to Puolakka (2021), Hämeenlinna Smart Prison is a modern prison facility located in Hämeenlinna, Finland. It is known for its innovative use of technology and design to create a more humane and effective prison environment. The prison was designed to promote rehabilitation and reduce recidivism rates by providing a variety of programs and services to inmates, including education and vocational training, mental health services, and substance abuse treatment. It also emphasizes a collaborative approach to managing inmates, with staff working closely with prisoners to establish individualized goals and plans for reintegration into society. One of the unique features of Hämeenlinna Smart Prison is its use of technology to enhance security and improve communication between staff and inmates. For example, inmates wear electronic bracelets that track their movements and alert staff to any potential security issues. The prison also uses digital tools to manage inmate schedules and provide real-time information about activities and programs.

Effects of digital education on incarcerated students

Digital education has the potential to positively impact incarcerated students by providing them with access to educational opportunities that may have otherwise been unavailable to them. In this section, we look at various research in this regard.

In a 2017 study, McDougall et al. evaluated the effects of digital technology on prison culture and inmates'...
capacity to self-regulate their behavior and commit crimes. 13 prisons in the UK that had self-service technology installed during a 7-year period were investigated by the authors using a natural stepped-wedge design. The frequency of disciplinary actions within and between the jails was examined before and after installation using a longitudinal multi-level model. Reoffending was also studied in contrast to a control sample. A prisoner survey and usage data provided support for the quantitative findings. The authors state that over a two-year period, prison discipline offenses were greatly decreased, and that reoffending in the first year following release was reduced by 5.36% as opposed to a reduction of 0.78% in comparator institutions. According to the prisoner survey and usage data, inmates felt far more in control of their life while incarcerated and much more capable of utilizing technology outside of prison. The authors emphasized that the changes brought about by the adoption of digital technology present a chance to make jails and prisons better learning and rehabilitation environments for inmates, contributing to a safer society.

Several researchers (Farley and Pike, 2016, Ndunagu and Tanglang, 2019) have discussed the impact of digital education in lowering the rate of recidivism. Smith (2020) investigated the use of technology purpose of providing education and technical skills for inmates using the Delphi method as the qualitative study design, with three rounds used to achieve an agreement on the introduction of technology in prison education. The authors grouped the participants into three with round 1 n =75 and round 2 n = 35 while the third round has 32 Participants. These participants were Regional Correctional Educational Directors and other prison education employees from different U.S. prisons. Over 70% of experts polled believed that digital and technical skills education could lower incarceration, boost opportunities for college education while incarcerated, and improve employability after release. The studies revealed that for necessary computer and primary software use, the highest degree of agreement was 94.2%. However, despite the ability to reduce recidivism by providing inmates with sufficient job skills upon release, less than 70% of participants considered the logistical requirements for implementing technology in prison education to be a priority or viable. Implications for practice include shifting prison rule of thumb from a punishment-based to a rehabilitation-based strategy in order to prioritize educational programs and improve inmates’ chances of social integration following release, as well as reduce recidivism.

Badejo and Chakraborty (2022) embarked on a study where 80 incarcerated students participated in a survey to gather data on the motivational effects of technology on incarcerated students learning experience. The study found that using technology to learn in a classroom has a beneficial impact on jailed students' motivation and engagement. The survey responses from the detained children provided insight into how existing technologies have affected their time in the juvenile facilities. The students who are incarcerated hope that through enhancing education delivery, they would still be relevant after their release. The study suggests expanding the use of technology to make jailed kids productive as they change their undesirable behaviors.

In an effort to assess the effects of digital education on pupils who are incarcerated, Lohiniva (2022) carried out a study that concentrated on assessing the importance of digital literacy for prisoners to help them in their post-prison life. The research assessed the Finnish prison and the "Smart Prison" initiative, which provides digital instruction and information technology to inmates in Finnish prisons. The research looked at how digital literacy can help prisoners succeed in life after prison. The research examined the prospects for employment options, social benefits from having technological expertise in post-prison life, and readmission into society among Finnish prisoners and evaluated their knowledge and understanding of these topics. The findings showed that Finland’s cutting-edge prisons, which are just starting out, offer inmates digital education in three different categories. These include data administration, virtual reality, and artificial intelligence. In addition to these, additional fundamental digital skills are being taught, including internet shopping, office software, and video calling. The inmates are earning money by using their digital abilities. It is anticipated that the digital education they are receiving will considerably aid their post-prison reintegration into society. Better job prospects are anticipated for them from a variety of sources. Because of their digital education, inmates are also required to apply for benefits efficiently.

CONCLUSION
In order to find pertinent research on the adoption of digital education and its effects on students who are incarcerated, we conducted extensive consultations when conducting this review. The past ten years have seen little study. This implies that further study in these fields is necessary.

According to our research, some nations have adopted and used digital learning, but there is a significant digital gap. Due to concerns that allowing incarcerated pupils access to the internet might compromise the security of the prison system, it was forbidden for them to use it.

Our findings show that embracing technology enhanced teaching/learning in the prison will be beneficial in the following ways:

1. Technology-enhanced learning has the potential to provide incarcerated students with access to educational resources and opportunities that may not be available in traditional correctional facilities.
2. The use of technology in correctional facilities can help to reduce recidivism rates and increase post-release employment and educational opportunities for incarcerated individuals.
3. However, the effectiveness of technology-enhanced learning in correctional facilities may depend on several factors, including access to technology, the quality of educational content, and the support of correctional staff.
4. The limited number of studies available on this topic suggests a need for further research to better understand the potential benefits and challenges of technology-enhanced learning for incarcerated students.

Conclusively, technology-enhanced learning has the potential to be a valuable tool for improving educational outcomes and reducing recidivism rates for incarcerated students. However, more research is needed to determine the most effective ways to implement technology-enhanced learning in correctional facilities and ensure that all incarcerated individuals have access to these resources.

**Abbreviation**

TEL: Technology-enhanced learning
LMS: Learning Management System
COVID: Coronavirus Disease
CTE: Career and Technical Education
DVD: Digital Video Disc
ERIC: Education Resources Information Center
GED: General Education Development
HEPPP: Higher Education Participation and Partnership Programme
ICT: Information and Communication Technology
JSTOR: Journal Storage
Moodle: Modular Object-Oriented Dynamic Learning Environment
OAC: Open Access College
PLEIADES: Portable Learning Environments for Incarcerated Adult Distance Education Students
REA: Rapid Evidence Assessment
SAM: Stand-Alone Moodle
SD: Secure Digital
SQCC: Southern Queensland Correctional Complex
UK: United Kingdom
US: United State
USQ: University of Queensland

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