Assessing the Efficacy of e-learning Resources in Facilitating Course Teaching in Cuddalore District of Tamil Nadu, India

S. Padmini [a++] and Pramila Ramani [b++*]

[a] *Department of Education, C. K. College of Education, Cuddalore, Tamil Nadu, India.*
[b] *Department of Education, Central University of Tamil Nadu, Thiruvarur, Tamil Nadu, India.*

Authors' contributions

This work was carried out in collaboration between all authors. Both authors read and approved the final manuscript.

Original Research Article

ABSTRACT

Technology is transforming education with new teaching and learning approaches. Online platforms, digital papers, and other resources have transformed education. This study examines B.Ed faculty members' views on using e-learning tools for the two-credit course 'Understanding Disciplines and School Subjects' to fill a gap in the literature. Objective: This study examines B.Ed faculty views on e-learning tools in 'Understanding Disciplines and School Subjects.' The purpose is to get opinions on technology in education. The study has many implications. Technology has a significant impact on schooling. The report highlights how online platforms and digital resources have transformed education delivery and reception. Addressing a Research Gap: This study addresses a literature gap. There appears to be little literature or study on incorporating e-learning technologies into the B.Ed curriculum, precisely the specified course. Academics Perspective: B.Ed

_____

[++] *Assistant Professor;*
Corresponding author: Email: pramila.maths@gmail.com;

academics who train teachers provide vital insights in this study. Perspectives can impact future teachers' adaptation to changing education. Study Sample: The researchers sampled 42 B.Ed. instructors from Tamil Nadu Teachers Education University in Cuddalore in 2023. The study used purposive sampling. Research Design: This qualitative study used surveys to obtain data. Open-ended questions were analysed using content analysis. Faculty members' e-learning positive and negative responses were evenly split. Four proposals were presented to improve e-learning resource generation.

1.INTRODUCTION

A conceptual framework facilitates the understanding and organisation of a research problem, making it more accessible and manageable. Currently, technology is revolutionising education through innovative methods of teaching and learning. The introduction of e-learning has revolutionised education by utilising online platforms, digital documents, and electronic resources [1]. In this context, it is necessary to interview B.Ed. faculty members regarding their utilisation of e-learning tools for professional development.

Teacher education programmes, specifically those that lead to a Bachelor of Education degree, prioritise developing disciplinary and subject knowledge [2]. Prospective educators gain the essential knowledge and pedagogical skills to teach diverse subjects. Due to technological advancements, educators now have a growing array of e-learning materials and resources for teaching this subject [3]. Various digital information formats, including interactive modules and multimedia presentations, enhance learning and comprehension.

The perspectives of B.Ed faculty members on e-learning materials are crucial as they will significantly influence the future trajectory of educational technology. Faculty members' teaching methods are influenced by their previous experiences. Hence, examining and gaining a deeper understanding of how B.Ed faculty members perceive and engage with e-learning materials designed for the course 'Understanding Disciplines and School Subjects' is crucial.

2. RELEVANCE OF RESEARCH

This study aims to address a significant gap in the current research by examining the perspectives of B.Ed faculty members on using e-learning tools in the course "Understanding Disciplines and School Subjects" within the B.Ed programme. Understanding the viewpoints of these educators is essential for various reasons. Padmini and Ramani [4] discovered that B.Ed. students encounter difficulties understanding specific components of the course 'Understanding Disciplines and School Subjects.'

This study's findings can inform teacher education programmes and curriculum designers in creating e-learning resources to enhance teachers' preparedness for their roles in a digital educational environment. To better align with the preferences and teaching styles of B.Ed faculty members, influential e-learning content creators should thoroughly understand their needs and preferences [5]. The faculty members' experiences with e-learning materials can impact their attitudes towards ongoing professional development and support lifelong learning in their teaching careers. Insights into B.Ed faculty members' perspectives on e-learning integration can inform the establishment of rules and guidelines for digital education. These insights can inform and enhance policymakers' development of educational technology policies.

The purpose of this research is to understand the viewpoints held by B.Ed faculty members on utilising e-learning technologies within the framework of the specific course entitled "Understanding Disciplines and School Subjects." The primary purpose is to conduct research and poll people about their thoughts on the topic of incorporating technology into the classroom. Importance: This research is essential for several reasons, including the following: Impact on Education: It acknowledges the revolutionary impact that technology has had on the educational system. The research acknowledges that the delivery and reception of education have been considerably altered due to the proliferation of online platforms and digital resources. It is filling a gap in the research that already exists. The purpose of the study is to address a problem already existing in the

previous research. It implies that there may be a dearth of relevant material or studies pertaining specifically to the incorporation of e-learning technologies into the B.Ed curriculum, in particular for the course that is being questioned. The study provides significant insights from educators directly involved in teacher training by concentrating on the viewpoints of B.Ed faculty members. Their viewpoints can affect how aspiring educators are prepared for the shifting educational landscape.

3. REVIEW OF RELATED LITERATURE

The Investigators examined nineteen studies on the topics mentioned above.

i. Research commonly linked to e-learning.
ii. Research in the field of Bachelor of Education focuses on e-learning.
iii. The research focuses on e-learning in various B.Ed. subjects.
iv. Research various topics covered in the Bachelor of Education programme.
v. The research conducted in the Bachelor of Education programme focuses on the comprehension of disciplines and school subjects.

3.1 Research commonly linked to e-learning

Mamattah [6] investigated the attitudes of students towards e-learning. This thesis investigates student perspectives on e-learning as a substitute for traditional classroom teaching. The ease of e-learning has been facilitated by advancements in technology, leading to the need for further investigation. Student insights were crucial as students are the primary beneficiaries. The study involved the distribution of 80 questionnaires at HO Polytechnic in Ghana. The study indicates that the majority of students perceive e-learning as a creative approach and advocate for its support. A minority of students express concerns regarding employment discrimination concerning e-learning. Participants expressed a preference for hybrid learning, which integrates both online and in-person instruction. The survey suggests that Ghanaian schools should prioritise investing in e-learning resources rather than satellite campuses, as students express a preference for a blended learning approach.

Thakkar and Joshi [7] investigated student attitudes towards E-learning. The utilisation of technology in teaching and learning is on the rise. E-learning has the potential to address India's expanding educational requirements, given its substantial population and limited educational resources. The success of e-learning is contingent upon the preparedness of students. The effectiveness of e-learning is contingent upon students' adaptability despite its numerous advantages. This study investigates the perspectives of engineering diploma students regarding e-learning. Surveys are employed in this study. The sample consisted of 56 students enrolled in a diploma programme in information technology engineering. The data was obtained through the utilisation of an attitude scale. This study conducted a comparative analysis to investigate student attitudes towards E-learning based on gender, locality (rural/urban), and caste (General/Reserved).

Encarnacion, Galang, and Haller [8] conducted a study. The impact of e-learning on teaching and learning was investigated. This article assesses the influence of e-learning on the Undergraduate Programme (UGP) and General Foundation Programme (GFP) at Oman Tourism College in Muscat, Oman. Methodology - A combination of strategies was employed to assess the E-Learning experience of both teachers and students, utilising online surveys. The effectiveness of e-learning was evaluated using five indicators. The study employed the five components to assess the level of agreement between instructors and students regarding the effectiveness of E-Learning. This study investigated the perspectives of both students and teachers regarding E-Learning. The study also analysed the influence of e-learning on instructional methods and education.

Yawson & Yamoah [9] conducted a study titled Understanding satisfaction essentials of E-learning in higher education: A multi-generational cohort perspective. Despite the growing importance of e-learning in higher education, little is known about multi-generational students' satisfaction with online courses. This study examines the perceived value of multi-generational students' cohorts' Moodle educational experiences. Multi-generational students (N = 611) were surveyed on a core subject in an undergraduate business school curriculum. Generations X, Y, and Z students have diverse satisfaction levels in course design, delivery, environment, and manner of delivery of the online programme. Generations cohorts affect online learning student satisfaction

significantly. The results imply that contextualising online instruction based on multi-generational students' cohort composition may improve student learning and satisfaction.

Mohsen Almahasees, Amin [10] conducted a study on Assessing professor and student online learning attitudes. Many schools are affected by COVID-19. Academic crisis management and response were studied. Jordan's primary schooling is online during the pandemic. After four months of online education, professors and students completed two learning questionnaires. Two polls examined professors' and students' online learning opinions. Jordan's online education pros and downsides were analysed by randomly assigning 50 instructors and 280 students. Zoom, Microsoft Teams, and WhatsApp dominated Jordanian classroom and student communication. The survey found that professors and students thought online education assisted throughout the pandemic. Online learning is less effective than in-person. Students and teachers worry about online learning. Hard-of-hearing students need help with online learning. Communication, motivation, technology, Internet, data privacy, and security are issues. Everyone agreed that online learning was good. Self-directed learning, affordability, applicability, and adaptability were perks. During the COVID-19 epidemic, online learning is temporary but cannot replace in-person learning. The study suggests blended learning for rigorous learning.

Gopal, Singh, and Aggarwal [11] examined how COVID-19 affects student pleasure and performance in online classes. This study investigates online student satisfaction and academic achievement in light of the COVID-19 pandemic. 544 Indian university students studying business management (B.B.A or M.B.A) or hotel management supplied quantitative data in an online survey. They use structural equation modelling to test theories. Study: Four traits boost student satisfaction and academic performance. These include instructor quality, course design, timely feedback, and student expectations. To ensure online course satisfaction and performance, educational administration must consider four factors. During the COVID-19 pandemic, this study is examining how online education influences student achievement.

Muthuprasad, Aiswarya, Aditya, and Jha [12] conducted a study on the perspectives of Indian students regarding online education. The global closure of schools due to the COVID-19 pandemic has disrupted academic schedules. Many educational institutions utilise online platforms to administer academic activities. The need to address e-learning preparation, design, and efficiency is critical in a rapidly developing country such as India. Device suitability is a crucial consideration in light of bandwidth limitations. A total of 307 agriculture students were surveyed through an online platform to gather their perspectives on online learning. Our study focused on analysing student preferences regarding various elements of online classes to aid in the development of effective learning environments. During the pandemic, a majority of respondents, precisely 70%, opted for online classes as a means to fulfil their curriculum requirements. The majority of students expressed a preference for using cell phones for online learning. A content analysis indicates that students have a preference for recorded courses that include end-of-class assessments as a means to enhance their learning experience. Despite the limited availability of internet connectivity in remote areas, students have expressed that online lessons offer flexibility and convenience. Online agricultural education may require a significant adjustment period due to its predominantly practical nature. This article may be beneficial for the development of hybrid learning curricula.

This study examines the attitudes of high school students towards e-learning Ninsiana et al. [13]. This study investigated the impact of online learning on the English proficiency of high school students. The study included a sample of 50 intermediate students and 73 individuals who took the OQPT. Participants were subsequently allocated to experimental (EG) (n=25) and control (CG) (n=25) groups using random assignment. Following a standard English pretest, the experimental group (EG) was provided with the messaging application WhatsApp. We received three lessons from Vision Book 3 through the messaging application WhatsApp. We are currently seeking individuals to enrol in our personalised online computer graphics courses. Following three instructional sessions, both groups completed the general English posttest. A total of 10 students participated in the administration of e-learning attitude questionnaires and interviews. The results of the posttest indicated that the experimental group (EG) achieved higher performance than the control group. The results of the one-sample test indicate that EFL students

have a preference for e-learning as a method of English instruction. Interviews revealed that e-learning challenges encompassed issues such as limited computer skills, difficulty maintaining focus on the screen, and insufficient access to reliable internet connections.

Mutua & Nyoni [14] conducted a study titled Undergraduate e-learning programmes in health professions: An integrative review of evaluation standards in low- and middle-income countries. Universities offered blended learning before COVID-19. After the pandemic, all educational institutions closed, and most had to switch to e-learning to assist student learning. Most institutions struggled with this shift since there were no e-learning standards. The researcher reviewed relevant literature to understand undergraduate health professions e-learning programme criteria.

3.2 Research in the Field of Bachelor of Education Focuses on e-learning

In 2019 Nath & Bairagya [15], Birbhum and Purba Medinipur District B.Ed. Trainees' E-Learning Attitudes and ICT Familiarity were assessed. E-learning and ICT attitudes of B.Ed. students are assessed. Assess B.Ed. teacher trainees' ICT competence. ICT, literacy, and anxiety were measured. B.Ed. students' ICT access, knowledge, anxiety, E-learning environment, and attitudes are assessed by gender, age, method subject, and institution type. The research was descriptive and differential. They were researching three B.Ed. programmes. This study used simple random sampling. B.Ed. programmes enrolled 96. E-learning technology, knowledge, worry, and attitude. A t-test showed significant participant group differences. A T-test determines statement acceptance. The study found that B.Ed. teacher trainees lack ICT abilities regardless of gender, age, optional subject, or institution. Practical ICT skills training may help B.Ed. teachers use ICT. Education should emphasise ICT. Teacher trainees can contact educators via email, blogs, and social media. Students and professors ignore PowerPoint slides and movies at varying levels. Authorities require digital education plans.

Srivastava [16] studied B.Ed. student teachers' e-learning attitudes. This study evaluates B.Ed. student teachers' E-Learning views. This study employed descriptive survey methodologies. This poll comprises all Varanasi B.Ed. students from self-financed and government colleges affiliated with state and central universities. We selected 100 B.Ed. candidates from Central and State

colleges. An equal sample of 50 self-funded and 50 government-funded students. Selecting will use stratified random sampling. The average e-learning score was 294. Average score: B.Ed. student teachers appreciate e-learning. There was no gender or school management difference. There were geographical disparities.

3.3 The Research Focuses on e-learning in Various B.Ed. Subjects

Applegate [17] conducted a study titled 'E-Learning Acceptance: Online Teaching Degree Earners and What Principals Think. Bachelor of education degrees are available online as online education grows. After graduation, pupils will look for work. K-12 education candidates may have different job prospects than those with regular degrees. Previous studies have ignored the issue of online degree holders acquiring jobs. As online education grows, it is essential to determine if K-12 principals' impressions of online education programmes may inhibit online teacher graduates from finding work. The qualitative critical case study examined how K-12 principals' perceptions affected recruiting licenced graduates with bachelor degrees from online teaching programmes. The results showed that principals consider several aspects when choosing teachers but not where or how they got their degrees. The topic became increasingly relevant with Covid 19 in the US and school districts switching to online learning.

In 2022, ReechaJrall and Kiran [18] studied. This project created and tested an e-content module to teach B.Ed students "ICT and its Application". Electronic content lets students and teachers customise learning, making it appealing. To educate Bachelor of Education ICT, an E-Content module was created, validated, and reviewed. One group was tested before and after. We randomly selected 52 B.Ed student-teachers. This data came from the E-Content Module and achievement tests. Pre- and post-intervention achievement tests assessed e-content module effectiveness. Electronic content boosts B.Ed grades. According to research, instructors should recruit potential teachers this way.

Anand [19] did "An Evaluative Study of the B.Ed. Curricula Operative in Universities with Specific Reference to Environmental Education." 2023. Environmental education's history, expansion, and impact on teacher education are examined. India is studied for worldwide environmental issues. This study analyses how individuals and environmental groups handle these concerns.

The B.Ed. Programme contains two data collection, research, and interpretation components. The study design includes title, objectives, key terms, delimitations, population, sample, data collection, and analysis. Second-year B.Ed. students evaluate environmental education. The programme evaluates pre-service teachers' environmental education knowledge, awareness, and attitude using a proprietary questionnaire.

Padmini & Ramani [20] examined B.Ed students' perceptions of 'Understanding the Disciplines and Academic Subjects' in teacher education programmes. Teacher education programmes like the B.Ed. strive to improve academic knowledge in numerous subjects. Tamil Nadu Teachers Education University's B.Ed programme requires expertise in many fields. Tamil Nadu Teachers Education University B.Ed students' opinions on 'Understanding Disciplines and School Subjects' subtopics? Examine B.Ed students' perspectives of Tamil Nadu Teachers Education University's "Understanding Disciplines and School Subjects" course. B.Ed. students from Tamil Nadu Teachers Education University in Cuddalore in 2023 were studied. B.Ed is studied in 30 Cuddalore colleges by 3,000 students. In 2023, 523 randomly selected Cuddalore B.Ed. Tamil Nadu Teachers Education University students were studied. This study used cluster sampling. Five of 30 colleges were randomly chosen for investigation. Study Hypothesis: Null Hypothesis: B.Ed. students 'Understanding Disciplines and School Subjects' opinions are similar. The study's findings will assist educators in enhancing pedagogical approaches and redesigning the teaching-learning process to make education more accessible, especially for B.Ed students who wish to teach.

3.4 Research Various Topics Covered in the Bachelor of Education programme

Fatima and Naaz [21] examined B.Ed. Geography academic performance and subject enrichment utilising interactive learning. This study compared B.Ed. trainees' average content test performance in experimental and control groups and between men and women. The study employed a "two-group post-test design". Sampling deliberately 70 of 130 B.Ed. Geography majors were tested. The experimental group received knowledge-enhancing treatment, while the control group received regular training. This study revealed that interactive learning increased B.Ed. students' topic understanding and performance.

3.5 The Research Conducted in the Bachelor of Education Programme Focuses on the Comprehension of Disciplines and School Subjects

Matthiessen [22] focused on Giovanni Parodi's Registerial profiles of school and university subjects in Register cartography. This section covers school and university registration. Giovanni Parodi examined university discipline registerial profiles and systematic functional school topic profiles. Both aspects are complementary. These innovative contributions establish the entire perspective, allowing future research to fill gaps as personal registration repertoires develop. This study clarifies'register' and 'genre' in situational linguistic functional variation.

Hudson, Gerickeb, Schellerc, and Political [23] explored school topic discipline transitions, highlighting powerful knowledge and epistemic quality. Comparative topic didactics measures academic discipline changes across school topics in this study. The theoretical framework calls classroom-to-society transfer 'strong knowledge', 'transformation', and 'epistemic quality'. We examine empirical studies from the Knowledge and Quality across School Subjects and Teacher Education (KOSS) network using a framework.1. Footnote1. This study uses powerful knowledge and specialist information to investigate discipline transitions in different school topics. Frontier empirical data analysis uses wide subject groups. This study uses Biglan, a common classification approach, to study higher education. Finally, curriculum planning, teacher education policies, and subject-specific educational material comprehension.

Padmini & Ramani [4] conducted a research titled Crafting E-Learning Pathways: A Student's Insight into the Course 'Understanding Disciplines and School Subjects' Offered in Teacher Education in Cuddalore District of TamilNadu, India. A conceptual framework simplifies study organisation and helps understand the research problem. Technology is transforming education with new teaching and learning approaches. E-learning has changed education via online platforms, digital papers, and electronic tools. This study examines B.Ed students' views on e-learning technologies for

the course 'Understanding Disciplines and School Subjects' to fill a research gap. Sample Choice: The researchers chose 540 2023 Tamil Nadu Teachers Education University B.Ed. students from Cuddalore. The study used purposive sampling. Research Design: This study collected data using qualitative approaches, mainly surveys. Analysing open-ended questions with content analysis. Data Gathering Tools: This study collected data using an open-ended questionnaire. Students' e-learning positive and negative answers were evenly distributed. Eight suggestions were made to improve e-learning resource generation. E-learning tools in Indian languages can improve "Understanding Disciplines and School Subjects," according to the recommendation. E-learning producers must be content and technological experts.

Padmini & Ramani [24] tested B. Ed students on school and disciplinary E-learning modules in Cuddalore. Conceptual frameworks define research questions and structures. Tech-based learning changes digital education. E-learning transformed education with digital platforms, content, and tech. Education majors should understand e-learning professional growth. E-learning and digital instruction have grown—evaluation of B.Ed students' e-learning attitudes. Higher education technology instruction is crucial. 'Understanding Disciplines and School Subjects' suggests B.Ed e-learning. Researchers want B.Ed students' e-learning content,

accessibility, and usability comments. The 2023 study included all Cuddalore B.Ed. Tamil Nadu Teachers Education University students. Study data was collected by questionnaire. E-learning, technology, and 'Video lectures' were popular among B.Ed students. B.Ed students recommend e-learning diversity. Students use multimedia, interactive modules, and real-world images. Higher education needs student e-learning product feedback. This input changes students instantly.

Thompson [25] in 'Subject Disciplines and the Construction of Teachers' Identities.' This chapter examines how disciplinary identity shapes teachers' identities. Teachers must educate morally and pedagogically, according to the chapter. No matter their speciality, teachers must understand subject concepts and evidence. This chapter proposes that teachers' sociocultural identities are shaped by their conceptual understanding of teaching a topic in various settings. This chapter uses beginning English teachers as a case study to evaluate subject disciplines, school subjects, and teacher identities.

4. YEAR WISE ANALYSIS OF THE REVIEWED LITERATURE

About nineteen different studies were examined by the researchers. Table 1 provides a comprehensive overview of the numerous research by tabulating them according to the year they were conducted.

Table 1. Year wise analysis of the review conducted

S.No	Author	Topic	Findings of the study
1	Fatima and Naaz [21]	Analysed B.Ed. Geography academic performance and subject enrichment using interactive learning approaches	This study found that interactive learning improved B.Ed. students' topic understanding and academic performance.
2	Mamattah [6]	Examined students' e-learning attitudes	According to the survey, Ghanaian schools should invest in e-learning resources over satellite campuses because pupils desire mixed learning.
3	Thakkar and Joshi [7]	Examined student perceptions toward E-learning	Student attitudes regarding E-learning technologies were the study's primary focus. They examined gender, geography, and social category attitudes. Results showed that diploma engineering students strongly favour E-learning. This attitude is unaffected by student gender, geography, or social class.
4	Nath & Bairagya [15]	study titled 'B.Ed. Trainees' Attitude Towards E-Learning in Relation to their ICT Familiarity	Though available, teachers and students neglect PowerPoint slides and movies for various educational levels. When creating digital education approaches, authorities must prepare.
5	Applegate [17]	E-Learning Acceptance: Online Teaching Degree Earners and What	The results showed that principals consider several aspects when choosing teachers but not where or how they got their degrees. The topic became increasingly

S.No	Author	Topic	Findings of the study
		Principals Think	relevant with Covid 19 in the US and school districts switching to online learning.
6	Encarnacion, Galang, and Haller [8].	E-learning was studied for its effects on teaching and learning	E-learning received superior evaluations on the five effectiveness criteria from teachers and students. E-learning was liked by teachers and students for improving instruction and information transfer.
7	Yawson & Yamoah [9]	Understanding satisfaction essentials of E-learning in higher education: A multi-generational cohort perspective.	Generations cohorts affect online learning student satisfaction significantly. The results imply that contextualising online instruction based on multi-generational students' cohort composition may improve student learning and satisfaction.
8	Gopal, Singh, and Aggarwal [11]	Evaluated how online classes affected student happiness and performance during the COVID-19 epidemic	This study found that instructor quality is the most significant factor affecting online student happiness. The instructor must lecture efficiently. To emphasise course material, one must grasp student psychology. Proper course delivery improves student satisfaction and performance. Teachers' excitement improves online learning.
9	Matthiessen [22]	Studied Register cartography, explicitly focusing on Giovanni Parodi's research on Registerial profiles of school subjects and university disciplines	This result found that students must read texts in a more extensive register than they write in. However, registerial profiles of areas of study represent the subjects and disciplines students approach as learners.
10	Mohsen Almahasees, Amin [10]	Faculty and student attitudes to online learning were studied.	The analysis found that 60% of professors had taught online before COVID-19. In contrast, 40% of the instructors had not gained online teaching experience before COVID-19. With 66% of those with expertise having undergone online teaching training, 34% had not participated in online learning sessions.
11	Muthuprasad, Aiswarya, Aditya, and Jha [12]	Evaluated Indian students' views on online education	Students said online classes are flexible and convenient, although isolated areas have restricted connectivity.
12	Ninsiana et al. [13]	E-learning attitudes of high school students are examined in this study.	The posttest showed that the experimental group outperformed the control group. EFL students prefer e-learning for English instruction, according to the one-sample test.
13	ReechaJrall and Kiran [18]	Studied in 2022. The project developed and tested an e-content module to help B.Ed students understand "ICT and its Application"	Electronic content improves B.Ed students' academic achievement. According to research, instructors should use this method to engage potential teachers
14	Anand [19]	Undertook "An Evaluative Study of the B.Ed. Curricula Operative in Universities	Using a proprietary questionnaire, the program assesses pre-service teachers' environmental education knowledge, awareness, and attitude.
15	Hudson, Gerickeb, Schellerc, and Political [23]	Conducted a study analyzing the transformations of disciplines across school subjects	The multidimensional scaling technique, based on their evaluations, identified 'dimensions' where the disciplines diverged. All disciplines shared three dimensions: Paradigms [25] that specify the appropriate problems for study and the appropriate methods to be used on a hard-soft continuum. Concerns with practical problems on a pure-applied continuum. Concerns with life systems on a life-nonlife continuum
16	Mutua & Nyoni [14]	Undergraduate e-learning programmes in health professions: An integrative review of evaluation standards in low- and	They synthesised guidelines for evaluating undergraduate health professions e-learning programmes in LMICs (low- and middle-income countries) in this review. All included publications showed a gap in clinical teaching and learning

S.No	Author	Topic	Findings of the study
		middle-income countries	standards in undergraduate health professions e-learning programmes. This review's eight unique LMIC principles may help health professions' e-learning initiatives be contextually suitable.
17	Padmini & Ramani [20]	Crafting E-Learning Pathways: A Student's Insight into the Course 'Understanding Disciplines and School Subjects' Offered in Teacher Education in Cuddalore District of TamilNadu, India	Students' e-learning positive and negative responses were evenly split. Eight ideas were presented to improve e-learning resource generation. Recommendations: To improve "Understanding Disciplines and School Subjects," create Indian-language e-learning resources. The e-learning producer's content and technical skills are crucial.
18	Padmini & Ramani [20]	Perceptions of B.Ed Students on the Course of 'Understanding the Disciplines and Academic Subjects'	The study's findings will help educators improve pedagogical methods and alter the teaching-learning process to make education more understandable, especially for B.Ed students who want to teach
19	Srivastava [16]	The Attitude of B.Ed. Pupil Teachers Towards E-Learning	No gender or school management difference was found. Geographical differences occurred.

From Table 1, the following research gap was identified, and it is elaborated on in the following paragraph

5. IDENTIFYING THE RESEARCH GAP AND RATIONALE OF THE STUDY

This research is supported by several studies [6,7,8,13,16] that have examined the literature on e-learning, its efficacy, and its application in education, specifically in the field of teacher education. The researchers also examined student attitudes towards and preferences for utilising e-learning tools. The study focused on e-learning research conducted during the COVID-19 pandemic. The studies conducted by Almahasees, Mohsen, & Amin [10], Gopal, Singh, & Aggarwal [10], and Muthuprasad, Aiswarya, Aditya, & Jha [12] provide evidence supporting the efficacy of online learning during the pandemic. Furthermore, the researchers conducted a comprehensive analysis of Bachelor of Education (B.Ed.) studies focusing on the implementation of e-learning across various subject areas. Fatima and Naaz [21], ReechaJrall and Kiran]18], and Anand [19] found benefits in teaching and studying B.Ed. courses. The study examined the works of Matthiessen [22], Thompson [24], Hudson, Gerickeb, Schellerc, and Political [23] to gain insights into the challenges and demands associated with different academic disciplines and school subjects. According to Nath and Bairagya [15], the study found that B.Ed. teacher trainees, regardless of their gender, age, optional subject, or institution, have limited access to and expertise in ICT. No studies have been conducted at the B.Ed level on the topic of 'Understanding Disciplines and School Subjects,' despite the existing research on e-learning.

Researching the perspectives of B.Ed faculty members on creating e-learning materials for 'Understanding Disciplines and School Subjects' is essential.

6. RESEARCH PURPOSE

- This study seeks to explore the perceptions of B.Ed. faculty members regarding e-learning resources to improve their teaching of various disciplines and academic subjects. This study aims to assess the efficacy of e-learning resources in facilitating subject teaching through a systematic analysis of participants' perspectives.
- Analyse the user's preferences and past experiences with different types of e-learning content—barriers and challenges in the utilisation of e-learning resources. This study aims to identify the limitations of e-learning resources to enhance their effectiveness in supporting teacher education.

7. RESEARCH PROBLEM AND OBJECTIVES

7.1 Title

Assessing the Efficacy of e-learning Resources in Facilitating Course Teaching in Cuddalore District of Tamilnadu

7.2 Research Questions

What are the perceptions of teacher education faculty members regarding the effectiveness of e-learning pathways in teaching different disciplines and school subjects?

- What challenges and barriers do teacher education faculty members face when accessing and engaging with e-learning materials related to disciplines and school subjects?
- What resources and support systems are required to effectively implement e-learning pathways in teacher education programmes?

7.3 Research Objectives

- The objective of this study is to understand the perceptions of teacher education faculty members regarding the effectiveness of e-learning pathways in teaching different disciplines and school subjects.
- The objective of this study is to identify the challenges and barriers faced by teacher education faculty members in accessing and engaging with e-learning materials related to various disciplines and school subjects.
- The objective is to identify the necessary resources and support systems for the successful implementation of e-learning pathways in teacher education programmes.

8. OPERATIONALISATION OF TERMS

8.1 e-learning Materials

E-learning materials refer to digital resources, content, and tools designed for educational purposes and delivered electronically, typically through the Internet or computer-based platforms. Educational resources encompass a range of formats, including text-based content (e-books, articles, PDFs), multimedia content (video lectures, audio lectures, interactive simulations, animations), interactive learning modules, online courses, learning management systems (LMS), online quizzes and assessments, synchronous and asynchronous content, learning apps, and mobile content.

8.2 Understanding Disciplines and School Subjects

This research focuses on the curriculum and pedagogic studies offered in the Bachelor of Education degree programme at Tamil Nadu Teachers Education University. Specifically, the research investigates the course 'Understanding Disciplines and School Subjects.'

9. METHODOLOGY

9.1 Population of the Study

The population of the study consisted of all of the faculty members who worked at the B.Ed. Tamil Nadu Teachers Education University in the Cuddalore district of Tamilnadu during the year 2023. In the Cuddalore district of Tamilnadu, approximately 420 faculty members are teaching in the colleges that are a part of the Bachelor of Education (B.Ed.) courses. These institutions number thirty in total.

9.2 Sample of the Study

As a study sample, the investigators chose 42 B.Ed. faculty members working at the Tamil Nadu Teachers Education University in the Cuddalore region of Tamilnadu during the year 2023. (Margin of error: 14.36%, population proportion 50%)

9.3 Sampling Technique

This study made use of a method known as purposeful sampling. The research sample comprised all of the teaching staff from the four institutions that were chosen randomly for the investigation.

9.4 Research Design

The qualitative research study utilised the survey approach, and open-ended questions were evaluated using content analysis by categorising the codes and summarising the findings. The summative method was utilised for doing the content analysis.

9.5 Tools for Data Collection

For this study, an open-ended questionnaire was utilised to collect data. The questionnaire's level of reliability inter-coder reliability was determined and utilised. Three different coders separately evaluated the responses, and the level of agreement was determined by comparing the three sets of findings. The content validity of the open-ended questionnaire was ensured by selecting open-ended questions that clearly connect with the research objectives and adequately investigate the subject matter. This method was done to maximise the information gleaned from the respondents.

9.6 Procedure for Data Collection

In the e-learning course titled "Understanding Disciplines and School Subjects," the researchers created an open-ended survey for the students to complete. Both the reliability and validity of the questionnaire were investigated.

After the pilot study results were analysed, necessary adjustments were made to the questionnaire. The altered questionnaire was utilised for data gathering.

10. RESULTS

Open-ended questions were analysed qualitatively using content analysis.

Research Question 1: What are the perceptions of teacher education faculty members regarding the effectiveness of e-learning pathways in teaching different disciplines and school subjects?

Research Objective 1: The objective of this study is to understand the perceptions of teacher education faculty members regarding the effectiveness of e-learning pathways in teaching different disciplines and school subjects.

Question 1: What e-learning tools or resources do you find most effective for teaching the course 'Understanding Disciplines and School Subjects?', and how have they enhanced your students' learning experiences?

- These materials can enhance student learning by making it more interactive, accessible, and engaging.
- I must acquire the technological skills necessary to create or utilise electronic instructional materials.
- Numerous websites and platforms devoted to education offer content on a wide range of subjects and disciplines.
- I can prepare course materials for "Understanding Disciplines and School Subjects" using online textbooks and digital texts.
- I can create videos using YouTube or specialised video editing software.
- Using interactive simulations and virtual laboratories, I can instruct students and assist them in comprehending complex concepts in various disciplines.

Research Question 2: What challenges and barriers do teacher education faculty members face when accessing and engaging with e-learning materials related to disciplines and school subjects?

Research Objective 2: The objective of this study is to identify the challenges and barriers faced by teacher education faculty members in accessing and engaging with e-learning materials related to various disciplines and school subjects.

Question 2: What obstacles have you encountered when using e-learning materials, and how have you addressed or overcome them?

- I did not encounter any obstacles. In a pleasant disposition
- Utilising e-learning resources was challenging due to my poor Internet connection. I prefer in-person instruction over online learning because various instructional methods can be utilised.
- Employing e-learning resources confronted me with challenges. The course "Understanding Disciplines and School Subjects" requires sufficient guidelines for developing and utilising e-learning materials.
- Yes, utilising e-learning resources posed challenges for me; there are insufficient devices accessible, and 'Understanding Disciplines and School Subjects' requires extensive preparation and explanation before instruction.
- Due to sporadic internet connectivity, I occasionally have trouble using e-learning materials to teach 'Understanding Disciplines and School Subjects. '

Question 3: What are the benefits and drawbacks of using the university's learning management system (LMS) for instructional purposes?

- LMS is very beneficial and convenient because it provides a central location for course materials assignments, communication, and evaluation.
- It provides students with flexible learning schedules.
- Yes, I like LMS because it allows for structured content organisation.
- I would not say I like LMS because not all pupils will likely be comfortable with technology.
- Creating a highly personalised learning environment is challenging.

Question 4: Please describe any challenges or difficulties you have encountered while utilising e-learning materials. If you have encountered

obstacles, please tell your specific problems and how they affected your e-learning experience.

- I did not encounter any obstacles.
- E-learning necessitates clear guidelines for all participants.
- My internet connection is frequently erratic, making it difficult for me to access e-learning materials.
- Slow internet speeds have been an ongoing problem, resulting in buffering and interruptions during online classes.
- I experienced issues with software compatibility, as specific e-learning platforms did not function properly on my device.
- The e-learning application malfunctions frequently, and I struggle to navigate the course content.
- The fact that not all students have access to computers or tablets makes it difficult for some of us to keep up with online courses.
- Include more interactive elements, such as quizzes, simulations, and discussion forums, to engage students in the course content.
- Multimedia resources, such as videos and animations, can enhance the engagement and memorability of the content.
- Include interactive elements like quizzes, simulations, and discussion forums to engage students with the course material.
- Multimedia resources, such as videos and animations, can enhance the engagement and memorability of the content.
- Promote peer learning and a sense of community among students by encouraging group projects and collaborative assignments.
- Allow students to choose between asynchronous and synchronous learning depending on their inclinations.
- Both students and instructors should have received e-learning environment training.
- Students and instructors require appropriate training
- Both instructors and pupils play a vital role in enhancing e-learning experiences.

Research Question 3: What resources and support systems are required to effectively implement e-learning pathways in teacher education programmes?

Research Objective 3: The objective is to identify the necessary resources and support systems for the successful implementation of e-learning pathways in teacher education programmes.

Question 5: Do you have any additional comments or suggestions regarding e-learning and its function in teaching the course 'Understanding Disciplines and School Subjects' as a B.Ed faculty member? Please feel free to share any insights or suggestions that come to mind.

- E-learning can be an effective instrument for simplifying complex subject matter concepts. We ought to investigate interactive technologies such as virtual laboratories and multimedia resources.
- As educators, we must consider the variety of student learning methods. Offering a range of e-learning materials, including videos and readings, can accommodate a variety of preferences.
- Continuous faculty training and development is required to keep up with the evolution of e-learning tools and methodologies.
- It is essential that all pupils, including those with disabilities, have access to e-learning content. Formatting, captions, and alternative text must be standard.
- To maintain student interest, we must employ gamification, peer discussions, and subject-related real-world case studies.
- E-learning should include both formative and summative evaluations. It is essential to evaluate both subject comprehension and the efficacy of e-learning.

Question 6: How would you enhance the e-learning experiences for the course 'Understanding Disciplines and School Subjects?'
- By incorporating more interactive elements such as virtual labs, simulations, and discussion forums, the subject can be more enjoyable.
- By integrating multimedia resources such as video lectures, animations, and infographics to convey complex concepts more effectively.
- Scheduling live sessions with the instructor or subject matter experts can aid in clarifying questions and fostering a sense of community.

- By encouraging group projects and collaborative assignments to facilitate peer-to-peer learning and cultivate a sense of community among students.
- Providing well-defined learning objectives for each module enables students to

comprehend what is expected of them and what is expected of them.
- By implementing adaptive learning technologies that customise course content based on individual students' performance and learning patterns

10.1 Comprehensive analysis of answers given by students for various questions

Table 2. Comprehensive analysis of answers given by students for multiple questions

S.No	Positive points for understanding the topic of 'Understanding Disciplines and School Subjects'	Negative points for understanding the topic of 'Understanding Disciplines and School Subjects'
1	These materials can enhance student learning by making it more interactive, accessible, and engaging	I must acquire the technological skills necessary to create or utilise electronic instructional materials.
2	Numerous websites and platforms devoted to education offer content on a wide range of subjects and disciplines. I can prepare course materials for "Understanding Disciplines and School Subjects" using online textbooks and digital texts. I can create videos using YouTube or specialised video editing software. Using interactive simulations and virtual laboratories, I can instruct students and assist them in comprehending complex concepts in various disciplines.	I did not encounter any obstacles. In a pleasant disposition Utilising e-learning resources was challenging due to my poor Internet connection. I prefer in-person instruction over online learning because various instructional methods can be utilised. Employing e-learning resources confronted me with challenges. The course "Understanding Disciplines and School Subjects" requires sufficient guidelines for developing and utilising e-learning materials. Yes, utilising e-learning resources posed challenges for me; there are insufficient devices accessible, and 'Understanding Disciplines and School Subjects' requires extensive preparation and explanation before instruction. Due to sporadic internet connectivity, I occasionally have trouble using e-learning materials to teach 'Understanding Disciplines and School Subjects. '
3	LMS is very beneficial and convenient because it provides a central location for course materials assignments, communication, and evaluation. It provides students with flexible learning schedules. Yes, I like LMS because it allows for structured content organisation.	I would not say I like LMS because not all pupils will likely be comfortable with technology. Creating a highly personalised learning environment is challenging.
4	I did not encounter any obstacles. By incorporating more interactive elements such as virtual labs, simulations, and discussion forums, the subject can be more enjoyable. By integrating multimedia resources such as video lectures, animations, and infographics to convey complex concepts more effectively. Scheduling live sessions with the instructor or subject matter experts can aid in clarifying questions and fostering a sense of community. By encouraging group projects and collaborative assignments to facilitate peer-to-peer learning and cultivate a sense of community among students. Providing well-defined learning objectives for each module enables students to comprehend what is	E-learning necessitates clear guidelines for all participants. My internet connection is frequently erratic, making it difficult for me to access e-learning materials. Slow internet speeds have been an ongoing problem, resulting in buffering and interruptions during online classes. I experienced issues with software compatibility, as specific e-learning platforms did not function properly on my device. The e-learning application malfunctions frequently, and I struggle to navigate the course content. The fact that not all students have access to computers or tablets makes it difficult for some of us to keep up with online courses. Include more interactive elements, such as quizzes, simulations, and discussion forums, to engage students in the course content. Multimedia resources, such as videos and animations, can enhance the engagement and memorability of the content.

S.No	Positive points for understanding the topic of 'Understanding Disciplines and School Subjects'	Negative points for understanding the topic of 'Understanding Disciplines and School Subjects'
	expected of them and what is expected of them. By implementing adaptive learning technologies that customise course content based on individual students' performance and learning patterns.	Include interactive elements like quizzes, simulations, and discussion forums to engage students with the course material
5	Multimedia resources, such as videos and animations, can enhance the engagement and memorability of the content. Promote peer learning and a sense of community among students by encouraging group projects and collaborative assignments	Allow students to choose between asynchronous and synchronous learning depending on their inclinations. Both students and instructors should have received e-learning environment training. Students and instructors require appropriate training Both instructors and pupils play a vital role in enhancing e-learning experiences.
6	E-learning can be an effective instrument for simplifying complex subject matter concepts. We ought to investigate interactive technologies such as virtual laboratories and multimedia resources. As educators, we must consider the variety of student learning methods. Offering a range of e-learning materials, including videos and readings, can accommodate a variety of preferences.	Continuous faculty training and development is required to keep up with the evolution of e-learning tools and methodologies. It is essential that all pupils, including those with disabilities, have access to e-learning content. Formatting, captions, and alternative text must be standard. To maintain student interest, we must employ gamification, peer discussions, and subject-related real-world case studies. E-learning should include both formative and summative evaluations. It is essential to evaluate both subject comprehension and the efficacy of e-learning.

11. FINDINGS OF THE STUDY

The content analysis of the open-ended questions revealed twenty positive points and twenty-five negative points for using e-learning resources in the classroom when instructing students on the subject of "Understanding Disciplines and School Subjects." There is a significant imbalance between the positive and negative points. A few recommendations were made to enhance the overall standard of producing e-learning resources.

12. DISCUSSION AND CONCLUSION

Within the context of teacher education programmes in the Cuddalore district of Tamil Nadu, this research investigates how distinct e-learning pathways influence the instruction of various academic fields and subjects for students. According to the findings of a study conducted by Padmini and Ramani [20], students enrolled in B.Ed programmes require assistance in understanding the content of the course titled "Understanding the Disciplines and Academic Subjects." In this study, we investigate whether or not the use of e-learning materials will assist students in gaining a holistic understanding of the topic. The researchers Fatima and Naaz [21], Mamattah [6], Thakkar and Joshi [7], Nath and Bairagya [15], and Encarnacion, Galang, and Haller [8] did a study to investigate the effects that e-learning has on teaching and learning. The results of this research have shed light on several crucial facets associated with using e-learning in educational settings. E-learning is now an essential component of all the programmes being used to educate teachers in the region. Traditional instructional strategies are gradually being supplemented by digital resources and platforms, which are being introduced by educational institutions that prepare teachers. In addition, most faculty members involved in the education of future teachers had favourable impressions on the efficiency of online learning avenues. According to their report, the utilisation of e-learning materials improved the teaching of academic disciplines and subjects, with several individuals considering it to be an essential component for instructors. In addition, they offered suggestions for how the production of educational materials for use in online learning environments should be improved.

13. LIMITATIONS OF THIS RESEARCH

In this study, a technique known as purposive sampling was used. Because of this, the result cannot be extrapolated to apply to all of the B.Ed students in Tamil Nadu. In subsequent studies, mixed research methodologies, including qualitative and quantitative sampling techniques and probability sampling approaches, may be utilised to perform the research.

14. POLICY RECOMMENDATIONS

Develop guidelines for the distribution of resources, with the goal of enhancing and maintaining the technological infrastructure required to support e-learning. It is crucial to provide students and teachers with dependable internet connectivity and the appropriate software and hardware. Encourage using standardised e-learning platforms and tools across educational institutions as part of a campaign to promote their acceptance. This research might allow students more consistent experiences while using online learning platforms. Make proposals for new laws that will make it easier for teachers to continue their education and grow their careers, including ineffective methods of online instruction, the creation of new curricula, and the integration of new technologies. This study's results help elevate the education standard available over the internet.

REFERENCES

1. Bilal S. e-learning revolutionise education: An exploratory study. E-learning: A Boom or Curse. 2015;1-5.
   Retrieved October 25, 2023, from https://www.researchgate.net/publication/280862765_E-Learning_Revolutionise_Education_An_Exploratory_study

2. Stefaner M, Baur D. Teacher initial education; 2023.
   Retrieved October 25, 2023, from Education GPS: The World of Education At Your Fingertips: https://gpseducation.oecd.org/revieweducationpolicies/#!node=&filter=all

3. U.S. Department of Education. Reimagining the Role of Technology in Education:. USA: 2017 National Education Technology Plan Update; 2017.
   Retrieved October 25, 2023, from chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://tech.ed.gov/files/2017/01/NETP17.pdf

4. Padmini S, Ramani P. Crafting E-Learning Pathways: A Student's Insight into the Course 'Understanding Disciplines and School Subjects' Offered in Teacher Education in Cuddalore District of Tamil Nadu, India. Advances in Research. 2023, October 30;24(6):146-159. DOI:10.9734/AIR/2023/v24i6995

5. OECD. Teaching Practices, Teachers' Beliefs and Attitudes. Creating Effective Teaching and Learning Environments: First Results from TALIS; 2009.
   Retrieved October 25, 2023, from chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.oecd.org/berlin/43541655.pdf

6. Mamattah R. Students' perceptions of e-Learning. Linköping: Linköping University, |Department of Behavioural Sciences and Learning; 2016.
   Retrieved September 28, 2023, from http://www.diva-portal.org/smash/get/diva2:925978/FULLTEXT01.pdf

7. Thakkar S, Joshi H. Students' Attitude towards e-learning. International Journal of Advance Engineering and Research

Development. 2017, November;4(11):209-213.
DOI: 10.21090/IJAERD.15380

8. Encarnacion R, Galang A, Hallar B. The Impact and Effectiveness of e-Learning on Teaching. International Journal of Computing Sciences Research. 2020, June 30;5:383-397.
Retrieved september 28-09-2023, 2023, from https://stepacademic.net

9. Yawson D, Yamoah F. Understanding satisfaction essentials of e-learning in higher education: A multi-generational cohort perspective. Heliyon; 2020.
DOI:https://doi.org/10.1016/j.heliyon.2020.e05519

10. Almahasees Z, Mohsen K, Amin M. Faculty's and students' perceptions of online learning during COVID-19. Sec. Digital Education. 2021, May 12;6.
DOI:https://doi.org/10.3389/feduc.2021.638470

11. Gopal R, Singh V, Aggarwal A. 2021, April 21 Impact of online classes on the satisfaction and performance of students during the pandemic period of COVID 19. Education and Information Technologies. November 2021;26:6923–6947.
DOI:https://doi.org/10.1007/s10639-021-10523-1

12. Muthuprasad T, Aiswarya S, Aditya K, Jha G. Students' perception and preference for online education in India during COVID -19 pandemic. Social Sciences & Humanities Open. 2021;3(1).
DOI:https://doi.org/10.1016/j.ssaho.2020.100101

13. Ninsiana W, Gabidullina F, Widodo M, Patra I, Pallathadka H, Alkhateeb D, Gheisari A. High School Students' Attitudes towards e-Learning and Impacts of Online Instruction on their general english learning: Challenges and Issues. Education Research International. 2022; 2022:10.
Retrieved September 30, 2023, from https://doi.org/10.1155/2022/9103862

14. Mutua M, Nyoni C. Undergraduate e-learning programmes in health professions: An integrative review of evaluation standards in low- and middle-income countries. National Library of Medicine. 2023, February;18(2).
DOI:10.1371/journal.pone.0281586

15. Nath R, Bairagya S. B.Ed. Trainees' attitude towards e-learning in relation to their ICT Familiarity in Birbhum and Purba Medinipur Distric. © 2019 IJRAR June).
www.ijrar.org (E-ISSN 2348-1269, International Journal of Research and Analytical Reviews (IJRAR), 2019;6(2): 159-169.
Retrieved October 19, 2023, from https://www.researchgate.net/publication/352572417_BEd_Trainees'_Attitude_Towards_E-Learning_in_Relation_to_their_ICT_Familiarity_in_Birbhum_and_Purba_Medinipur_District

16. Srivastava P. A Study on Attitude of B.Ed. Pupil teachers towards e-learning. International Journal of Creative Research Thoughts (IJCRT). 2023 June;11(6):h18-h24.
Retrieved September 28, 2023, from https://www.researchgate.net/publication/372133106_A_Study_On_Attitude_Of_BEd_Pupil_Teachers_Towards_E-Learning

17. Applegate C. E-Learning Acceptance: Online Teaching Degree Earners and What Principals Think. In B. Bernal-Morales, Health and Academic Achievement. Book Metrics Overview; 2020.
Retrieved October 25, 2023, from https://www.intechopen.com/chapters/74502

18. ReechaJrall, Kiran. Development of e-content module and measuring effectiveness in the topic understanding ICT and its Application at B.Ed Level. International Journal of Early Childhood Special Education (INT-JECSE). 2022;14(5):5443-5449.
DOI: 10.9756/INTJECSE/V14I5.665

19. Anand M. An Evaluative Study of the B.Ed. Curricula operative in Universities with Specific Reference to Environmental Education. Journal of Teacher Education and Research. 2023;18(1).
DOI:https://doi.org/10.36268/JTER/18103

20. Padmini S, Ramani P. Perceptions of B.Ed Students on the Course of 'Understanding the Disciplines and Academic Subjects' Offered in Teacher Education Programs. Asian Journal of Advanced Research and Reports, 2023, October 19;17(11):272-282.
DOI:10.9734/ajarr/2023/v17i11574

21. Fatima K, Naaz S. Impact of Participatory learning technique on the content

enrichment of B.Ed . Trainees. MIER Journal of Educational Studies Trends and Practices. 2015, November;5(2). DOI:https://doi.org/10.52634/mier/2015/v5/i2/1501

22. Matthiessen C. Register cartography and Giovanni Parodi's research: Registerial profiles of school subjects and university disciplines. Revista signos. 2021, December;54(107): 799-841.
DOI:10.4067/S0718-09342021000300799

23. Hudson B, Gerickeb N, Schellerc C, Political M. Trajectories of powerful knowledge and epistemic quality: analysing the transformations from disciplines across school subjects. Journal of Curriculum Studies, 2023, February 26;119-137.

DOI:https://doi.org/10.1080/00220272.2023.2182164

24. Padmini, S., & Ramani, P.. Opinions of B. Ed Students in the Cuddalore District of Tamil Nadu about E-learning Materials for the Course of Understanding Disciplines and School Subjects in B.Ed. Asian Journal of Advanced Research and Reports, 320-343.
DOI:10.9734/ajarr/2023/v17i11579

25. Thompson I. Subject Disciplines and the Construction of Teachers' Identities. In I. Thompson, The Palgrave Handbook of Teacher Education Research; 2023. DOI:10.1007/978-3-030-59533-3_78-1

26. Kuhn T, Thomas S. The structure of scientific revolutions. Chicago: University of Chicago press; 2012. Retrieved October 30, 2023.

Peer-review history:
The peer review history for this paper can be accessed here:
https://www.sdiarticle5.com/review-history/108826