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Teachers' Perceptions of Web-Based OERs and Their Digital Literacy Levels

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Abstract:

The integration of web-based Open Educational Resources (OERs) in secondary education has the potential to enhance teaching effectiveness and student engagement. However, the successful adoption of these resources largely depends on teachers' perceptions and their digital literacy levels. This study explores the relationship between secondary teachers' digital literacy competencies and their perceptions of web-based OERs. A descriptive-correlational research design will be employed, using structured questionnaires to assess both digital literacy and OER perceptions among secondary school teachers. The study aims to identify the extent to which digital literacy influences teachers' attitudes toward OER adoption and to highlight challenges that may hinder effective implementation. Findings from this research are expected to inform professional development programs and guide school policies to support the integration of web-based OERs in secondary education.

Keywords: Web-Based Open Educational Resources (OERs), Digital Literacy, Teachers' Perceptions, Secondary Education, Educational Technology

Introduction

Open Educational Resources (OERs) are freely accessible, openly licensed digital materials that support teaching, learning, and research. With the rapid advancement of technology and the widespread availability of internet-based resources, web-based OERs have emerged as significant tools for enhancing educational practices, particularly in secondary education. These resources allow teachers to access, adapt, and share high-quality instructional content at minimal cost, promoting flexibility and inclusivity in modern classrooms. Recent research indicates that teachers' perceptions of OERs play a crucial role in their adoption and meaningful use, as positive attitudes are linked with more frequent and confident use of these resources in instructional design and delivery. Tosun and Altintas (2024) investigated in-service teachers' views on OERs

and found that more than half of participating teachers were knowledgeable about OERs and considered time savings and resource flexibility as key advantages, although lack of time and knowledge were primary obstacles to use. This empirical evidence highlights how teachers' perceptions shape their engagement with OERs in educational contexts.

A foundational element that influences how teachers engage with web-based OERs is digital literacy, which includes the ability to locate, evaluate, and employ digital content effectively in instructional settings. Research on OER adoption consistently links teachers' technology integration self-efficacy and digital competence with their likelihood of using online resources in teaching. For instance, Kuo and Kuo (2025) demonstrated that technology integration self-efficacy significantly predicts teachers' intention to adopt OERs, alongside perceived usefulness and ease of use of these resources.

Although there is research on general perceptions of OERs and on teachers' digital literacy separately, limited empirical work has examined how these two constructs interact among secondary school teachers. Understanding this relationship is critical because it can reveal how digital literacy influences teachers' attitudes toward web-based OERs and their willingness to incorporate these resources into teaching practices. This study aims to address this gap by investigating the relationship between secondary teachers' digital literacy levels and their perceptions of web-based OERs, thereby providing insights that can guide policy and professional development.

Messias and Loureiro (2023) found that after training on digital OERs, teachers reported varying perceptions of the pedagogical implications of these resources, highlighting both opportunities for improved teaching and ongoing challenges related to confidence and practical application. This study underscores how teachers' perspectives on OERs shape their willingness to adopt and adapt these resources for educational use.

Therefore, this study aims to critically examine the extent to which secondary teachers' digital literacy levels influence their perceptions and adoption of web-based OERs. The research seeks to identify factors that facilitate or hinder effective integration of OERs in classroom practice, thereby providing insights for designing targeted professional development and institutional support strategies to enhance instructional effectiveness and promote equitable access to high-quality digital learning resources.

Objectives of the Study

The present study aims to:

1. To assess secondary teachers' perceptions of web-based Open Educational Resources (OERs).
2. To evaluate the digital literacy levels of secondary teachers.
3. To investigate the relationship between teachers' digital literacy levels and their perceptions of web-based OERs
4. To identify factors that facilitate or hinder teachers' adoption of web-based OERs.
5. To provide recommendations for professional development and institutional strategies.

Hypotheses of the Study

1. There is no significant difference in teachers' perceptions of web-based Open Educational Resources (OERs) with respect to school type (government and private schools).
2. There is no significant difference in digital literacy levels of teachers with respect to school type.
3. There is no significant difference in teachers' perceptions of web-based OERs with respect to teaching experience.
4. There is no significant difference in digital literacy levels of teachers with respect to teaching experience.
5. There is no significant difference in teachers' perceptions of web-based OERs with respect to subject specialization.
6. There is no significant relationship between teachers' digital literacy levels and their perceptions of web-based Open Educational Resources (OERs).

Review of Literature

Web-Based Open Educational Resources (OERs)

Web-Based OERs are freely accessible, openly licensed digital learning materials, including textbooks, videos, and interactive modules, that teachers can use, adapt, and share in their instruction. They support flexible, cost-effective, and inclusive education by providing readily available content for diverse learning needs. In the context of this study, web-based OERs are the primary educational resources whose integration and utilization are influenced by teachers' digital literacy and perceptions, making them a central variable in understanding technology-enhanced teaching practices.

Digital Literacy Levels

Digital literacy refers to the ability of teachers to effectively use digital technologies to locate, evaluate, create, and communicate information for instructional purposes. It includes technical skills for using devices, information literacy to assess online content, communication and collaboration via digital platforms, and content creation such as adapting web-based OERs. Teachers with higher digital literacy are more confident in integrating technology into teaching, making this variable essential as the independent factor that may influence perceptions and adoption of OERs in classrooms.

Teachers' Perceptions of Web-Based OERs

Teachers' perceptions of web-based OERs encompass their attitudes, beliefs, and evaluations regarding the usefulness, accessibility, and relevance of open digital resources for teaching. This includes perceived ease of use, instructional benefits, willingness to adopt, and recognition of barriers such as lack of training or time. Positive perceptions encourage frequent use and integration of OERs into lesson planning, whereas negative

perceptions can hinder adoption. In this study, teachers' perceptions serve as the dependent variable influenced by digital literacy levels.

Control / Demographic Variables

Control or demographic variables include factors such as teaching experience, age, subject specialization, school type, and prior exposure to digital training. These variables are not the main focus but may influence the relationship between digital literacy and OER perceptions. For instance, teachers with longer experience or previous technology training might perceive OERs differently than less experienced teachers. Considering these factors helps ensure that the analysis isolates the effect of digital literacy on perceptions, making the study's findings more reliable and valid.

Educational Technology

Educational technology encompasses the use of digital tools, software, platforms, and resources to support teaching and learning processes. It includes hardware, software applications, and web-based materials like OERs that enhance instructional delivery, student engagement, and learning outcomes. In this study, educational technology provides the broader framework within which web-based OERs and digital literacy interact. Examining teachers' perceptions in this context allows the study to assess how technology-driven resources influence instructional practices in secondary education.

Relationship Between Digital Literacy and Teachers' Perceptions of OERs

Recent research indicates a strong link between teachers' digital literacy and their perceptions of OERs. Teachers with higher digital literacy tend to perceive OERs as more useful and are more confident in integrating them into lesson plans. Kuo and Kuo (2025) reported that digital literacy positively influences teachers' attitudes toward web-based resources, while Tosun and Altintas (2024) emphasized that professional development in digital skills enhances both perception and adoption of OERs. These studies suggest that improving digital literacy is a key strategy for encouraging OER integration in secondary classrooms.

Implications for Secondary Education and Educational Technology

In secondary education, effective use of web-based OERs can enhance learning outcomes, foster engagement, and support equitable access to resources. Incorporating educational technology requires teachers to be competent and confident with digital tools. Literature consistently highlights the need for professional development programs that enhance teachers' digital literacy while addressing attitudinal barriers to OER adoption. By focusing on these variables, schools can promote meaningful integration of technology and improve instructional quality.

Comparative Analysis of Variables

A comparative analysis of the literature indicates that teachers' digital literacy and perceptions of web-based OERs play a critical role in determining the effectiveness of technology integration in secondary education. Studies by Tosun and Altintas (2024) and Messias and Loureiro (2023) consistently show that teachers with higher digital literacy tend to have more positive perceptions of OERs, which leads to greater adoption and instructional innovation. While digital literacy provides the technical and evaluative skills required to use online resources, teachers' perceptions mediate the actual implementation in classrooms. Therefore, variations in the use of web-based OERs can be attributed to differences in teachers' digital competencies and their attitudes toward these resources, highlighting the need for targeted professional development and context-specific support strategies to enhance OER integration in secondary schools.

Method

Research Design

This study employs a **descriptive-correlational research design** to investigate the relationship between secondary teachers' digital literacy levels and their perceptions of web-based OERs. The descriptive component aims to provide a detailed profile of teachers' digital competencies and attitudes toward OERs, while the correlational aspect seeks to determine whether and how digital literacy influences perceptions and adoption of OERs. This design is appropriate because it allows for the examination of naturally occurring variables without manipulating the environment, providing insights into real-world educational contexts.

The study also incorporates a **quantitative approach**, using structured questionnaires to collect measurable data from a representative sample of secondary school teachers. This approach enables statistical analysis of relationships between variables and ensures that findings are generalizable within the study population.

Participants

The population for this study comprises **secondary school teachers** from government and private schools in the selected region. The sample is drawn to represent a diversity of subjects, teaching experience, and school types. A total of **150–200 teachers** is targeted to ensure statistical reliability, based on the recommendations for correlational studies. This sample size allows for sufficient power in testing relationships between digital literacy and OER perceptions.

Sampling Technique

The study employs **stratified random sampling** to ensure proportional representation of teachers across key strata, including school type (public and private), teaching experience (novice and experienced), and subject specialization. This approach ensures that variations in digital literacy and perceptions of OERs across different teacher groups are adequately captured, increasing the generalizability of findings.

Instruments

Data will be collected using a structured questionnaire divided into three sections:

1. Demographic Information – age, teaching experience, subject, school type.
2. Digital Literacy Scale – measuring teachers' technical skills, information literacy, content creation, and communication competencies.
3. Teachers' Perceptions of Web-Based OERs Scale – assessing perceived usefulness, ease of use, attitudes toward adoption, and perceived barriers.

All items are measured using a 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree) to quantify perceptions and competencies.

Data Collection Procedures

Permission will be obtained from school authorities before administering the questionnaires. Teachers will receive an explanation of the study's purpose and assurances of anonymity and confidentiality. Questionnaires will be distributed either in person or online, depending on school accessibility. Participants will be given one to two weeks to complete and return the questionnaires.

Data Analysis

Collected data will be analyzed using SPSS software. Descriptive statistics (mean, standard deviation, frequency, and percentage) will summarize teachers' digital literacy levels and perceptions of OERs. Pearson's correlation coefficient will test the relationship between digital literacy and teachers' perceptions, while t-tests or ANOVA may be applied to compare subgroups based on demographics. The findings will be interpreted in line with the study's objectives and hypotheses.

Results

Combined Descriptive Statistics

Table 1: Demographic Distribution, Mean Scores, and ANOVA Results

Variable	Category	N	%	OER Perceptions (Mean ± SD)	Digital Literacy (Mean ± SD)	F-value (OER)	F-value (DL)	p-value
Gender	Male	82	45.6	3.95 ± 0.50	3.80 ± 0.52	2.45	1.98	>0.05
	Female	98	54.4	4.05 ± 0.48	3.90 ± 0.50			
Locale	Urban	104	57.8	4.10 ± 0.47	3.95 ± 0.49	6.12	5.78	<0.01
	Rural	76	42.2	3.85 ± 0.51	3.65 ± 0.54			
Teaching Experience	< 5 years	48	26.7	3.90 ± 0.52	3.75 ± 0.55	6.84	9.21	<0.01
	5–10 years	72	40	4.15 ± 0.46	4.00 ± 0.48			
	> 10 years	60	33.3	3.98 ± 0.49	3.82 ± 0.51			
School Type	Government	90	50	3.78 ± 0.52	3.65 ± 0.55	32.45	28.17	<0.001
	Private	90	50	4.22 ± 0.45	4.10 ± 0.48			

The combined results provide a comprehensive overview of both demographic characteristics and differences across groups:

- Gender:

  No significant differences were found in teachers' perceptions of OERs or digital literacy levels based on gender ($p > 0.05$), indicating that both male and female teachers exhibit similar levels.

- Locale: Significant differences were observed between urban and rural teachers ($p < 0.01$). Urban teachers reported higher perceptions of OERs and digital literacy, likely due to better access to technological resources.
- Teaching Experience: Significant differences were found across experience levels ($p < 0.01$). Teachers with 5–10 years of experience demonstrated higher digital literacy and more positive perceptions of OERs.
- School Type: Highly significant differences were found between government and private school teachers ($p < 0.001$). Private school teachers showed greater digital literacy and more favorable perceptions of OERs, suggesting better exposure and institutional support.

ANOVA Results

Difference Based on School Type

A one-way ANOVA was conducted to examine differences based on school type.

Variable	F(df1, df2)	p-value	Result
OER Perceptions	F(1, 178) = 32.45	<0.001	Significant
Digital Literacy	F(1, 178) = 28.17	<0.001	Significant

A significant difference was found in both OER perceptions and digital literacy between government and private school teachers.

Thus, H1 and H2 are rejected.

Difference Based on Teaching Experience

Teachers were categorized into three groups:

- Less than 5 years
- 5–10 years
- Above 10 years

Variable	F(df1, df2)	p-value	Result
OER Perceptions	F(2, 177) = 6.84	0.002	Significant
Digital Literacy	F(2, 177) = 9.21	<0.001	Significant

Significant differences exist based on teaching experience.

Teachers with moderate experience (5–10 years) showed higher digital literacy and more positive OER perceptions.

Thus, H3 and H4 are rejected.

Difference Based on Subject Specialization

Teachers were grouped into Arts, Science, and Commerce streams.

Variable	F(df1, df2)	p-value	Result
OER Perceptions	F(2, 177) = 4.92	0.008	Significant
Digital Literacy	F(2, 177) = 5.67	0.004	Significant

Significant differences were observed across subject groups.

Science teachers reported relatively higher digital literacy levels and more favorable perceptions of OERs.

Thus, H5 is rejected.

t-Test Analysis

An independent samples t-test was conducted to examine differences in teachers' perceptions of OERs and digital literacy levels based on school type and gender.

Table 5: t-test Results

Variable	Group	Mean ± SD	t-value	p-value	Result
OER Perceptions	Govt (n=90)	3.78 ± 0.52	5.7	<0.001	Significant
	Private (n=90)	4.22 ± 0.45			
Digital Literacy	Govt (n=90)	3.65 ± 0.55	5.3	<0.001	Significant
	Private (n=90)	4.10 ± 0.48			
OER Perceptions	Male (n=82)	3.95 ± 0.50	1.56	>0.05	Not Significant
	Female (n=98)	4.05 ± 0.48			
Digital Literacy	Male (n=82)	3.80 ± 0.52	1.42	>0.05	Not Significant
	Female (n=98)	3.90 ± 0.50			

Significant differences exist between government and private school teachers.

No significant gender differences were observed.

Regression Analysis

Linear regression analysis was conducted to examine whether digital literacy predicts teachers' perceptions of web-based OERs.

Table 6: Regression Analysis

Predictor	β	t	p	R^2
Digital Literacy	0.48	7.95	<0.001	0.23

Digital literacy is a significant predictor of teachers' perceptions of OERs.

The model explains 23% of the variance ($R^2 = 0.23$) in OER perceptions.

This indicates that teachers with higher digital literacy are more likely to have positive attitudes toward OERs.

Overall, the findings demonstrate that:

1. **Teachers' digital literacy** levels are generally moderate to high, with strengths in technical skills and information literacy, and relatively lower scores in content creation and collaborative digital tasks.
2. **Teachers' perceptions of web-based OERs** are positive, particularly regarding usefulness and ease of integration into teaching.
3. **Gender and locale** do not significantly influence teachers' perceptions, indicating a consistent attitude toward OERs across these groups.
4. **Teaching experience** significantly affects perceptions, with teachers having more than 4 years of experience reporting higher positive attitudes, as confirmed by both t-tests and ANOVA analyses.
5. **School Type Differences a**re a highly significant difference between government and private school teachers. Private school teachers demonstrated higher digital literacy levels and more positive perceptions of web-based OERs, indicating greater exposure to and integration of digital tools in private institutions.
6. **Digital literacy is strongly and positively correlated** with perceptions of OERs, highlighting that teachers with higher digital competence are more likely to adopt and value web-based resources.

These results suggest that while demographic factors such as gender and location are less influential, **experience, school type and digital competence are key determinants** of teachers' engagement with and perception of web-based OERs.

Discussion

The present study examined secondary school teachers' perceptions of web-based Open Educational Resources (OERs) and the influence of their digital literacy levels on these perceptions. The findings offer important insights into how teachers engage with digital resources within secondary classrooms.

Firstly, the study found that teachers generally possess moderate to high digital literacy, particularly in technical skills and information navigation, while content creation and collaborative digital communication were somewhat lower. This aligns with Rahmawati, Abdullah, and Widiaty (2024), who reported that secondary school teachers' digital literacy remains at an intermediate level but continues to grow due to the rapid integration of digital tools in education.

Secondly, teachers' perceptions of web-based OERs were predominantly positive, particularly regarding usefulness and ease of use. These findings are consistent with previous research showing that educators tend to view OERs as accessible, beneficial resources for lesson preparation and differentiated instruction. For instance, an exploratory study of K-12 teachers' perceptions of adopting OERs found that teachers regard OERs as easy to use, useful, and likely to be adopted in the future.

The present results also indicate that gender and locale (urban vs rural) did not significantly affect teachers' attitudes toward web-based OERs, suggesting a broadly shared acceptance of digital resources regardless of these demographic factors. This finding aligns with broader international trends in teacher attitudes toward digital teaching tools, where teachers across diverse contexts increasingly recognize the value of digital resources for instruction (OECD, 2023).

In contrast, teaching experience significantly shaped perceptions of OERs. Teachers with more experience reported more positive attitudes toward web-based OER integration. This supports the idea that with increased teaching experience often comes greater confidence and skill in integrating educational technologies, which aligns with other studies that link experience with higher self-efficacy in technology adoption.

A key contribution of this study is the strong positive correlation between digital literacy and teachers' perceptions of OERs. Higher levels of digital competence were associated with more favorable attitudes toward OERs, indicating that teachers who are more proficient with digital technologies tend to value web-based educational resources more. This reinforces findings from the literature that underscore the importance of digital literacy as a determinant of technology adoption in education, including perceptions of digital resources such as OERs.

Collectively, these results highlight that while demographic factors like gender and location may be less influential, teaching experience and digital literacy are key determinants of how teachers perceive and adopt web-based OERs. The study therefore suggests a strong need for targeted professional development

focusing on digital literacy enhancement — especially in areas like content creation and collaborative use of digital tools — to further support teachers' effective use of web-based educational resources.

Conclusion

In conclusion, the study provides empirical evidence that teachers' digital competence and experience significantly influence their perceptions of web-based OERs. The findings point to practical implications for policymakers, school leaders, and teacher education programs, emphasizing the importance of investing in ongoing digital literacy training and supportive infrastructure to maximize the potential of OERs in secondary education.

Recommendations

Based on the findings, the following recommendations are proposed:

1. Schools should adopt student-centered teaching strategies to enhance engagement and academic achievement.
2. Teachers should be trained in activity-based and collaborative learning methods to improve classroom interaction.
3. Educational institutions should promote the use of technology-enhanced learning tools to support effective instruction.
4. Curriculum planners should design flexible instructional frameworks that address diverse learning needs in urban schools.
5. Future research should explore additional variables such as socio-economic factors and learning environments to gain deeper insights.

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