

Impact of Open Educational Resources (OER) on Teaching and Learning in Selected Engineering Colleges of Andhra Pradesh

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ABSTRACT

This study examines the impact of Open Educational Resources (OER) on teaching and learning among faculty and students at selected engineering colleges in Andhra Pradesh. Data were collected from 978 respondents using a structured questionnaire and a simple random sampling method, resulting in a response rate of 83.23%. Results show that most respondents (94.58%) were well aware of OER platforms like SWAYAM and NPTEL. A majority agreed that OER enhanced efficiency (74.13%), updated knowledge (73.93%), and improved teaching and learning quality (60.53%). Overall, 66.67 percent perceived a positive impact, and 72.19 percent expressed satisfaction with OER usage. The study concludes that OER significantly support effective, collaborative, and self-paced learning, and recommends institutional initiatives to promote wider adoption and training for sustained OER integration.

KEYWORDS: OER, Teaching and Learning, Awareness, Utilization, Engineering Education

INTRODUCTION

Open Educational Resources (OER) have revolutionized education by providing free, flexible, and shareable digital learning materials such as online courses, video lectures, and open textbooks. In India, platforms like SWAYAM, NPTEL, and the National Digital Library of India (NDLI) play a vital role in making quality education more accessible and inclusive.

In engineering education, where knowledge evolves rapidly, OER help students and faculty update skills and access global resources. This study examines the awareness, usage, and impact of OER among faculty and students of selected engineering colleges in Andhra Pradesh, focusing on how OER enhance teaching efficiency, learning outcomes, and user satisfaction.

RELATED LITERATURE

Lili, Zhang, and Lampropoulos (2025) conducted a meta-analysis of 32 studies involving 134,905 participants to assess whether Open Educational Resources (OER) and Open Educational Practices (OEP) improve learning performance, revealing only a negligible effect, indicating passive learner engagement. Balvant (2024) highlighted the strategic importance of OER in improving education quality, policy dialogue, and institutional capacity, while also identifying accessibility and awareness as key adoption challenges in India. Ndebele, Masuku, and Mlambo (2023) examined South African higher education financing policies and found that, although partially supportive, they remain insufficient for sustainable OER implementation. Baas et al. (2022) explored the collaborative role of “brokers” in promoting OER among 15 Dutch universities, emphasizing the significance of institutional networks in OER sustainability. Isa et al. (2022) studied accounting students’ shift to Open and Distance Learning (ODL) using OER and found positive perceptions of flexibility and accessibility, but persistent challenges in usability and awareness. Overall, these studies collectively underscore the growing relevance of OER in global higher education, while highlighting the persistent need for awareness, infrastructure, and policy support to maximize its educational impact.

OBJECTIVES

The study aimed to assess the awareness, usage, impact, sharing, and overall satisfaction of faculty and students with Open Educational Resources (OER) in selected engineering colleges of Andhra Pradesh.

1. To assess the level of awareness about Open Educational Resources (OER).
2. To identify the reasons behind the selection and use of specific OER.
3. To examine the impact of OER on enhancing learners’ efficiency.
4. To analyze how OER contribute to knowledge updating among users.
5. To evaluate the influence of OER on improving both learning and teaching processes.
6. To study the sharing of educational materials among students through OER.
7. To measure the overall satisfaction levels of users with OER.

METHODOLOGY

From a total population of 6,177 respondents across three selected engineering colleges, 1,175 questionnaires were distributed-325 from JNTUA, Anantapuramu; 470 from KSRM, Kadapa; and 380 from KEC, Kuppam. Out of these, 978 completed questionnaires were returned, comprising 265 from JNTUA, 400 from KSRM, and 313 from KEC, yielding a high response rate of 83.23 percent. The study employed a simple random sampling method to ensure unbiased data collection and representation from all three institutions.

Analysis and Interpretation of Data

The collected data were systematically analyzed and interpreted to identify key trends, patterns, and insights related to the respondents’ awareness, usage behavior, perceived impact, sharing practices, and overall satisfaction with the use of OER across the users of selected engineering institutions.

Table 1: Age-wise Distribution of Respondents

Age-wise		Academic Status		Gender		Total
		Faculty	Students	Male	Female	
18–22 Years	N	0	673	428	255	673
	%	0.00	98.25	66.98	75.22	68.81
23–27 Years	N	48	12	38	22	60
	%	16.38	1.75	5.95	6.49	6.13
28–32 Years	N	77	0	52	15	77
	%	26.28	0.00	8.14	4.42	7.87
33 and above Age	N	168	0	121	47	168
	%	57.34	0.00	18.94	13.86	17.18
Total	N	293	685	639	339	978
	%	100	100	100	100	100

It is evident from Table 1 that the majority of respondents (68.81%) fall within the 18–22 years age group, followed by 17.18 percent who are 33 years and above. Additionally, 7.87 percent of respondents are between 28–32 years, while 6.13 percent belong to the 23–27 years age group.

Table 2: Distribution of Respondents by Academic Status

Nature of Respondents		Gender		Type of Institution			Total
		Male	Female	JNTUA (Govt.)	KSRM (Auto.)	KEC (Priv.)	
Students	N	415	270	189	282	214	685
	%	64.95	79.65	71.32	70.50	68.37	70.04
Faculty	N	224	69	76	118	99	293
	%	35.05	20.35	28.68	29.50	31.63	29.96
Total	N	639	339	265	400	313	978
	%	100	100	100	100	100	100

Table 2 reveal that the majority of respondents (70.04%) were students, while 29.96 percent were faculty members. Among the 639 male respondents, 64.95 percent were students and 35.05 percent were faculty, whereas among the 339 female respondents, 79.65 percent were students and 20.35 percent were faculty members.

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Table 3: Awareness of Open Educational Resources

Opinion		Academic Status		Gender		Total
		Faculty	Students	Male	Female	
Yes, Very Well	N	288	637	605	320	925
	%	98.29	92.99	94.68	94.40	94.58
Somewhat	N	5	48	34	19	53
	%	1.71	7.01	5.32	5.60	5.42
Total	N	293	685	639	339	978
	%	100	100	100	100	100

Table 3 shows that a vast majority (94.58%) of respondents reported having a “very well” awareness of OER platforms such as SWAYAM and NPTEL, while only a small proportion (5.42%) indicated being “somewhat” aware. Among the faculty, most respondents (98.29%) stated they were “very well” aware of OER platforms, with only 1.71 per cent being “somewhat” aware. Similarly, a large majority (92.99%) of students reported being “very well” aware, while 7.01 per cent were “somewhat” aware of.

In terms of gender, 94.68 per cent of male respondents and 94.40 per cent of female respondents indicated that they were “very well” aware of OER platforms, leaving only small proportions (5.32% and 5.60%, respectively) who were “somewhat” aware of.

Table 4: Reasons for Using Particular OER

OER	Academic Status				Gender				Total (N=978)	
	Faculty (N=293)		Students (N=685)		Male (N=639)		Female (N=339)			
	N	%	N	%	N	%	N	%	N	%
Based on Assignment Needs	46	15.70	17	2.48	44	6.89	19	5.60	63	6.44
Suggested by Teacher	190	64.85	260	37.96	313	48.98	137	40.41	450	46.01
Agreed with Group	51	17.41	465	67.88	354	55.40	162	47.79	516	52.76
Help from Online Friends	5	1.71	53	7.74	38	5.95	20	5.90	58	5.93
My own choice	4	1.37	5	0.73	8	1.25	1	0.29	9	0.92

It is evident from Table 4 that the majority (52.76%) of the total respondents cited “agreed with group” as their primary reason for using OER, followed by “suggested by teachers” (46.01%), “assignment needs” (6.44%), “help from online friends” (5.93%) and “own choice” (0.92%), which were much less significant.

Table 5: Impact of OER on Enhancing Efficiency

Impact		Academic Status		Gender		Type of Institution			Total
		Faculty	Students	Male	Female	JNTUA (Govt.)	KSRM (Auto.)	KEC (Priv.)	
Strongly Agree	N	41	135	107	69	65	75	36	176
	%	13.99	19.71	16.74	20.35	24.53	18.75	11.50	18.00
Agree	N	235	490	476	249	177	290	258	725
	%	80.20	71.53	74.49	73.45	66.79	72.50	82.43	74.13
Somewhat Agree	N	17	60	56	21	23	35	19	77
	%	5.80	8.76	8.76	6.19	8.68	8.75	6.07	7.87
Total	N	293	685	639	339	265	400	313	978
	%	100	100	100	100	100	100	100	100

As presented in Table 5, most (74.13%) of the respondents agreed that OER enhanced their efficiency, followed by 18.00 per cent who strongly agreed and 7.87 per cent who somewhat agreed.

Table 6: Impact of OER on Updating Knowledge

Impact		Academic Status		Gender		Type of Institution			Total
		Faculty	Students	Male	Female	JNTUA (Govt.)	KSRM (Auto.)	KEC (Priv.)	
Strongly Agree	N	93	122	136	79	67	98	50	215
	%	31.74	17.81	21.28	23.30	25.28	24.50	15.97	21.98
Agree	N	191	532	473	250	186	286	251	723
	%	65.19	77.66	74.02	73.75	70.19	71.50	80.19	73.93
Somewhat Agree	N	9	31	30	10	12	16	12	40
	%	3.07	4.53	4.69	2.95	4.53	4.00	3.83	4.09
Total	N	293	685	639	339	265	400	313	978
	%	100	100	100	100	100	100	100	100

It is evident from Table 6 that a majority (73.93%) of respondents agreed that OER had a positive impact on updating knowledge, followed by 21.98 per cent who strongly agreed and 4.09 per cent who somewhat agreed.

Table 7: Impact of OER on Improving Learning and Teaching

Impact		Academic Status		Gender		Type of Institution			Total
		Faculty	Students	Male	Female	JNTUA (Govt.)	KSRM (Auto.)	KEC (Priv.)	
Strongly Agree	N	154	438	366	226	153	244	195	592
	%	52.56	63.94	57.28	66.67	57.74	61.00	62.30	60.53
Agree	N	116	241	254	103	108	143	106	357

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	%	39.59	35.18	39.75	30.38	40.75	35.75	33.87	36.50
Somewhat Agree	N	23	6	19	10	4	13	12	29
	%	7.85	0.88	2.97	2.95	1.51	3.25	3.83	2.97
Total	N	293	685	639	339	265	400	313	978
	%	100	100	100	100	100	100	100	100

As shown in Table 7, a majority (60.53%) of the respondents strongly agreed that OER improved learning and teaching, followed by 36.50 per cent who agreed and 2.97 per cent who somewhat agreed.

Table 8: Impact of OER on Learning and Teaching

Opinion		Academic Status		Gender		Type of Institution			Total
		Faculty	Students	Male	Female	JNTUA (Govt.)	KSRM (Auto.)	KEC (Priv.)	
Very Positive Impact	No.	107	193	203	97	102	104	94	300
	%	36.52	28.18	31.77	28.61	38.49	26.00	30.03	30.67
Positive	No.	176	476	419	233	154	290	208	652
	%	60.07	69.49	65.57	68.73	58.11	72.50	66.45	66.67
Little or No Impact	No.	10	16	17	9	9	6	11	26
	%	3.41	2.34	2.66	2.65	3.40	1.50	3.51	2.66
Total	No.	293	685	639	339	265	400	313	978
	%	100	100	100	100	100	100	100	100

It is clear from Table 8 that a majority (66.67%) of the total respondents reported that the impact of OER on learning and teaching was positive, followed by 30.67 per cent who felt that it was very positive and 2.66 per cent who indicated little or no impact of it.

Table 9: Sharing of Learning Materials (Lecture Notes, Assignments, etc.) with Other Students

Opinion		Academic Status		Gender		Type of Institution			Total
		Faculty	Students	Male	Female	JNTUA (Govt.)	KSRM (Auto.)	KEC (Priv.)	
Highly Likely	N	12	41	35	18	19	26	8	53
	%	4.10	5.99	5.48	5.31	7.17	6.50	2.56	5.42
Most Likely	N	66	220	214	72	84	107	95	286
	%	22.53	32.12	33.49	21.24	31.70	26.75	30.35	29.24
Likely	N	215	424	390	249	162	267	210	639
	%	73.38	61.90	61.03	73.45	61.13	66.75	67.09	65.34
Total	N	293	685	639	339	265	400	313	978
	%	100	100	100	100	100	100	100	100

It is evident from Table 9 that a majority (65.34%) of the total respondents reported that they were likely to share learning materials with other students, followed by 29.24 per cent who said that they were most likely and 5.42 per cent who said they were highly likely to do so.

Table 10: Overall Satisfaction with OER

Satisfaction		Academic Status		Gender		Type of Institution			Total
		Faculty	Students	Male	Female	JNTUA (Govt.)	KSRM (Auto.)	KEC (Priv.)	
Very Satisfied	N	42	118	113	47	47	54	59	160
	%	14.33	17.23	17.68	13.86	17.74	13.50	18.85	16.36
Satisfied	N	215	491	456	250	161	322	223	706
	%	73.38	71.68	71.36	73.75	60.75	80.50	71.25	72.19
Somewhat Satisfied	N	36	76	70	42	57	24	31	112
	%	12.29	11.09	10.95	12.39	21.51	6.00	9.90	11.45
Total	N	293	685	739	339	265	400	313	978
	%	100	100	100	100	100	100	100	100

Table 10 indicate that the majority (72.19%) of total respondents reported being satisfied with institutional OER (e.g., SWAYAM), 16.36 per cent were very satisfied and 11.45 per cent were somewhat satisfied.

FINDINGS

Based on the analysis, the following key findings were derived from the study on awareness, usage, and impact of Open Educational Resources (OER):

1. A vast majority of respondents (94.58%) demonstrated a very high level of awareness of OER platforms such as SWAYAM and NPTEL, indicating widespread familiarity among both students and faculty members.
2. Faculty members showed slightly greater awareness (98.29%) compared to students (92.99%), reflecting stronger professional engagement with OER platforms.
3. Gender-wise analysis revealed nearly equal awareness levels, with 94.68% of males and 94.40% of females reporting being “very well aware.”
4. The primary reason for using OER among respondents was “agreed with group” (52.76%), followed by “suggested by teachers” (46.01%), showing that collaborative and instructor-led influences drive OER adoption more than personal initiative.
5. A majority (74.13%) of respondents agreed that OER enhanced their efficiency, suggesting that OER use contributes to better academic performance and task management.
6. Most respondents (73.93%) agreed that OER helped in updating knowledge, emphasizing its value as a tool for continuous learning and professional development.
7. A considerable proportion (60.53%) strongly agreed that OER improved learning and teaching, further confirming its pedagogical significance.
8. The majority (66.67%) reported that OER had a positive impact on learning and teaching, with an additional 30.67% indicating a very positive impact.

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9. Regarding collaboration, 65.34% of respondents indicated that they were likely to share learning materials such as lecture notes and assignments with peers, reflecting a healthy culture of resource sharing.
10. Finally, a large majority (72.19%) of respondents reported being satisfied with institutional OER platforms, showing overall acceptance and positive perception of OER in supporting educational activities.

SUGGESTIONS

Based on the above findings, the following suggestions are proposed to strengthen awareness, accessibility, and utilization of Open Educational Resources (OER) among students and faculty in engineering colleges:

1. **Promote Institutional OER Awareness Programs:** Conduct regular workshops, seminars, and awareness campaigns on platforms like SWAYAM, NPTEL, and National Digital Library of India (NDLI) to enhance understanding and encourage wider participation.
2. **Encourage Faculty-Led OER Initiatives:** Faculty members, being key promoters of OER, should be encouraged to integrate open resources into their course materials, assignments, and assessments to enrich the learning experience.
3. **Develop a Structured OER Policy at Institutional Level:** Institutions should frame clear policies outlining standards for adoption, usage, and sharing of OER to ensure consistent practices and quality assurance.
4. **Enhance Collaborative Learning Culture:** Since group influence and peer suggestions drive OER usage, institutions should encourage study circles, peer-learning groups, and collaborative projects to promote active engagement with OER.
5. **Provide Training and Capacity Building:** Continuous training for both students and faculty on creating, adapting, and remixing OER can increase self-reliance and promote innovation in teaching and learning.
6. **Integrate OER into Curriculum Design:** Academic departments should include OER-based learning modules within the curriculum to promote flexible and blended learning approaches.
7. **Improve Digital Infrastructure and Access:** Strengthen institutional internet facilities, digital repositories, and e-learning platforms to support seamless access to OER materials anytime and anywhere.
8. **Encourage Sharing and Collaboration:** Institutions should create online sharing hubs or repositories where faculty and students can upload, share, and access learning materials developed locally.
9. **Conduct Periodic Feedback and Impact Studies:** Regular evaluation of OER adoption and its effectiveness in enhancing academic performance should be undertaken to identify areas for improvement.
10. **Recognize and Reward OER Contributors:** Establish incentives and recognition mechanisms for faculty and students who actively contribute to developing and promoting open educational content.

CONCLUSION

The study concludes that Open Educational Resources (OER) play a vital role in enhancing learning efficiency, knowledge updating, and teaching quality among students and faculty. A high level of awareness of platforms like SWAYAM and NPTEL was observed across all respondent groups. Most participants acknowledged the positive impact of OER on improving learning outcomes and fostering collaborative practices. However, issues such as limited training and technical challenges still hinder optimal utilization. Overall, OER have emerged as a valuable educational tool that supports inclusive, flexible, and technology-driven learning environments.

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