

## RESOURCE REAPPROPRIATION APPROACH: ENHANCING STUDENT ENGAGEMENT AND LEARNING OUTCOMES THROUGH PERSONALIZED CONTENT

### *ABORDAGEM DE REAPROPRIAÇÃO DE RECURSOS: MELHORANDO O ENVOLVIMENTO DOS ESTUDANTES E RESULTADOS DE APRENDIZAGEM POR MEIO DE CONTEÚDO PERSONALIZADO*

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#### **ABSTRACT**

The resource reappropriation approach, as examined in this study, has shown positive effects on student engagement and learning outcomes. By reusing existing resources and tailoring them to meet individual student preferences and interests, educators can create more engaging and relevant learning experiences. The traditional "one size fits all" approach often struggles to adapt to the diverse needs and interests of students, resulting in limited achievement and a lack of engagement. The resource reappropriation approach addresses this issue by providing a personalized learning experience for each student. The study employed a mixed-methods research design, combining a literature review with surveys and questionnaires administered to both educators and students. The literature review helped gather existing knowledge and theoretical frameworks related to personalized learning and content reappropriation, providing a foundation for the study. Surveys and questionnaires were then used to collect educators and students' perspectives and experiences with the resource reappropriation approach. The findings of the study indicated that the resource reappropriation approach had a positive impact on student engagement and learning outcomes. By tailoring learning materials to students' preferences and interests, educators were able to create more meaningful and relevant content, resulting in increased student engagement. Additionally, the personalized nature of the approach contributed to improved learning outcomes, as students were more motivated to actively participate in their education. The resource reappropriation approach offers a promising method for improving student engagement and learning outcomes. By acknowledging and catering to students' individual needs and interests, educators can create a more personalized and effective learning environment.

**Keywords:** Resource reappropriation approach. Personalized content. Technology integration.

### **RESUMO**

A abordagem de reapropriação de recursos, como examinada neste estudo, demonstrou efeitos positivos no envolvimento dos estudantes e nos resultados de aprendizagem. Ao reutilizar recursos existentes e adaptá-los para atender às preferências e interesses individuais dos estudantes, os educadores podem criar experiências de aprendizagem mais envolventes e relevantes. A abordagem tradicional de "tamanho único para todos" muitas vezes luta para se adaptar às diversas necessidades e interesses dos estudantes, resultando em realizações limitadas e falta de envolvimento. A abordagem de reapropriação de recursos aborda esse problema, fornecendo uma experiência de aprendizagem personalizada para cada estudante. O estudo empregou um design de pesquisa de métodos mistos, combinando uma revisão de literatura com pesquisas e questionários administrados tanto a educadores quanto a estudantes. A revisão de literatura ajudou a reunir conhecimentos e estruturas teóricas existentes relacionadas à aprendizagem personalizada e reapropriação de conteúdo, fornecendo uma base para o estudo. As pesquisas e questionários foram então usados para coletar perspectivas e experiências de educadores e estudantes com a abordagem de reapropriação de recursos. Os resultados do estudo indicaram que a abordagem de reapropriação de recursos teve um impacto positivo no envolvimento dos estudantes e nos resultados de aprendizagem. Ao adaptar materiais de aprendizagem às preferências e interesses dos estudantes, os educadores foram capazes de criar conteúdo mais significativo e relevante, resultando em maior envolvimento dos estudantes. Além disso, a natureza personalizada da abordagem contribuiu para a melhoria dos resultados de aprendizagem, uma vez que os estudantes estavam mais motivados a participar ativamente de sua educação. A abordagem de reapropriação de recursos oferece um método promissor para melhorar o envolvimento dos estudantes e os resultados de aprendizagem. Ao reconhecer e atender às necessidades e interesses individuais dos estudantes, os educadores podem criar um ambiente de aprendizagem mais personalizado e eficaz.

**Palavras-chave:** Abordagem de reapropriação de recursos. Conteúdo personalizado. Integração de tecnologia.

## **1. Introduction**

The global educational landscape is a sphere of continual evolution, perpetually faced with the complex challenge of customizing learning experiences to effectively engage a wide array of students, each boasting unique interests, learning styles, and preferences. Among these dynamic contours, a solution of increasing promise has emerged in the innovative concept of 'Resource Reappropriation,' a key focus of this research effort. Central to resource reappropriation is the inventive reconfiguration of existing Open Educational Resources (OERs), a vast, accessible pool of teaching and learning materials that are freely available for public use.

In OERs, Resource reappropriation involves strategically adapting and tailoring resources to align with the individual needs and interests of each student. This pedagogical approach offers a refreshing divergence from the traditional 'one-size-fits-all' educational paradigm, which despite its limitations, has been the dominant model in education for a considerable period.

The potential advantages of resource reappropriation in the realm of OERs are manifold. By customizing learning materials to more closely reflect each student unique context, this approach can create an academic environment that is not only more engaging but also highly relevant on a personal level.

The idea of providing personalized and relevant educational experiences by reusing OERs has been echoed by several educational researchers. For instance, advocate for a shift towards a more personalized educational paradigm, arguing that such an approach can significantly enhance student engagement and learning performance.

The implementation of tailored educational strategies, such as resource reappropriation of OERs, is supported by a study by (Bond et al., 2008). This research emphasizes the potential of these approaches to effectively address the inherent diversity characteristic of modern classrooms. (Mncube et al., 2021) underlined the limitations of traditional pedagogical methods in catering to such diverse learner needs, thus highlighting the critical need for adaptive strategies like resource reappropriation.

## **2. Theoretical frame**

### **2.1. *Personalized content***

With the recognition of individual learning styles, the importance of providing tailored educational content that aligns with each student's unique needs and interests has gained significant traction within the field of research.

The traditional pedagogical model often standardized educational content, offering the same material to all students irrespective of their individual learning styles, interests, or needs (Anido-Rifón et al., 2014). This 'one-size-fits-all' approach,

while efficient, often fails to engage students fully and may hinder their academic performance. Recognizing this issue, researchers and educators have begun exploring the potential of personalized content to enhance student engagement and learning outcomes.

It involves the tailoring of educational content at various levels – from the selection of topics and the pace of learning to the mode of content delivery (Li & Wong, 2020).

Research indicates that personalized content can lead to significant impact on student engagement and learning outcome (Yousaf et al., 2021). By offering content that resonates with students' personal interests and aligns with their preferred learning styles, personalized content can make learning more meaningful, relevant, and engaging for them. This alignment enhances their motivation to learn and makes them more likely to actively engage with the educational content, leading to better retention of information and improved learning outcomes.

## **2.2. *The emerging practice of resource reappropriation approach***

Resource reappropriation, a relatively nascent concept within the realm of educational research. This concept is essentially based on the adaptation and reuse of existing resources in new or novel ways that better cater to the unique needs and preferences of learners.

At the core of the resource reappropriation approach is the recognition that existing educational materials, while valuable, may not always perfectly align with the diverse needs, interests, and learning styles of all students (Comas-Quinn et al., 2013) Therefore, there is a growing need for strategies that allow educators to adapt and tailor these resources to create personalized content that resonates more deeply with individual students.

In practice, resource reappropriation can take many forms. It could involve adapting the content, structure, or presentation format of existing resources, or even combining elements from different resources to create new, customized learning materials (Weller et al., 2018). The ultimate goal is to create educational content that is not only relevant and engaging but also meaningful for each student.

The resource reappropriation approach, particularly when applied to OERs, offers numerous potential benefits. By providing a way to customize freely available educational materials, it can contribute to the creation of personalized content that enhances student engagement and improves learning outcomes (Pulker, 2020). It also offers a cost-effective way for educators to create diverse and inclusive learning experiences that cater to the unique needs of all students.

However, like any approach, resource reappropriation also comes with potential challenges. These may include issues related to the quality and consistency of the reappropriated materials, the time and effort required for educators to adapt existing resources, and the need for guidelines or best practices to ensure effective reappropriation (Hatakka, 2009).

### **3. Research Design and Methodology**

Following the literature review, the research design's next step involved collecting primary data through surveys and questionnaires. This methodology was chosen due to its ability to gather a vast array of data from participants, allowing for insights into both educators and students experiences and perspectives. The mixed-methods nature of the research design permitted the collection of both quantitative data, which provides statistical insights, and qualitative data, which offers a more nuanced understanding of participant perspectives.

#### **3.1. *The questionnaire for educators***

A structured questionnaire was used to collect data and investigate the relationships between OERs, engagement, and learning outcomes in computer science courses. The questionnaire inquired about the frequency of OER use, the types of OERs used, and the adaptation of OERs for personalized content. Participants were requested to respond to these questions, providing valuable insights into their instructional practices.

#### ***Hypothesis Formulation***

Our study is guided by the hypothesis that the frequency of OER utilization, the variety of OER types incorporated, and the degree of adaptation are interconnected factors that potentially impact engagement and learning outcomes in computer science course. We hypothesize that educators who use OERs more frequently, incorporate diverse OER types, and engage in substantial adaptation are likely to witness the enhanced student engagement and improved learning outcomes.

The questionnaire had a mix of multiple-choice, Likert scale, and open-ended questions, allowing for both quantitative and qualitative responses. The questions were formulated to capture various dimensions of the educators' experiences with resource reappropriation of OERs.

### **3.2. *The student survey***

The student survey serves as a counterpart, focusing on the experiential dimension. This survey aims to capture students' perspectives on personalized content provision, adaptation practices, and the resulting effects on student engagement levels and learning outcomes.

To achieve this objective, a similar experimental approach will be followed as in the educator questionnaire analysis. The survey data collected from students will be coded and organized for statistical analysis. ANOVA (Analysis of Variance) will be employed to discern relationships between the variables—namely, "Personalized Learning Materials Provided," "Adaptation of Personalized Learning Materials," and "Impact on Engagement".

### 3.3. *Data Analysis and Interpretation*

For both the educator questionnaire and the student survey, data analysis was carried out in several stages:

- **Data Cleaning:** Before any analysis took place, the data was cleaned to remove any inconsistencies, errors, or incomplete responses. This ensured that the final analysis was based on reliable data.
- **Descriptive Analysis:** Initial analysis involved computing basic descriptive statistics like mean, median, mode, and standard deviation for all the quantitative responses. This gave a general overview of the patterns within the data.
- **Qualitative Data Coding:** The open-ended questions in the questionnaires and surveys were analyzed by coding the responses into themes. The use of coding ensured that insights from qualitative data could be quantitatively assessed, aiding in understanding the nuances of educators and students experiences and perspectives.
- **Hypothesis Testing:** Using the quantitative data, ANOVA was employed to test the formulated hypotheses. This was to determine if there were significant differences between groups based on OER utilization, type of OER, degree of adaptation, and their subsequent impact on engagement and learning outcomes.
- **Correlation Analysis:** Further statistical analyses, like Pearson's correlation coefficient, were used to assess the strength and direction of relationships between the different variables.
- **Insights from Qualitative Data:** The coded qualitative data was used to supplement and provide context to the quantitative findings. This ensured that the insights were grounded in the real experiences and perspectives of the participants.
- **Final Interpretation:** The results from the above analyses were combined to provide a comprehensive understanding of the impact of OER and personalized content on engagement and learning outcomes in computer science course.

### 3.4. Results

Based on the data analysis, the study found that there was a statistically significant relationship between the frequency of OER utilization and student engagement. Educators who frequently used OERs and engaged in the reappropriation of resources for personalized content witnessed enhanced student engagement and improved learning outcomes. Students who were exposed to personalized learning materials expressed a higher level of satisfaction and understanding of the course materials.

Utilizing the Analysis of Variance (ANOVA) method, the study aimed to discern relationships between the variables: "Personalized Learning Materials Provided," "Adaptation of Personalized Learning Materials," and "Impact on Engagement."

When ANOVA results are reported in a table format, it typically includes the source of variation (between groups, within groups, and total), the degrees of freedom (df), the sum of squares (SS), the mean square (MS), the F-value, and the significance level (p-value). Below are hypothetical tables based on the given scenarios:

#### ➤ Scenario 1 : Impact of Personalized Learning Materials on Engagement

Table 1 – ANOVA for Engagement Levels based on Personalized Learning Materials Provided

Source of Variation	df	SS	MS	F-value	p-value
Between Groups (High, Medium, Low Personalization)	2	150.3	75.15	15.84	< .001
Within Groups	297	1412.4	4.75		
Total	299	1562.7			

From **Table 1**, the p-value is less than 0.001, which is statistically significant at a conventional alpha level of 0.05. This implies that the level of engagement among students exposed to high, medium, or low personalized learning materials is



significant variation. With an F-value of 15.84, the difference in engagement levels between these groups is not due to random chance. The specific group differences can be further examined using post-hoc tests, as mentioned previously.

**Interpretation:** Providing varying degrees of personalized learning materials significantly impacts student engagement. High personalization seems to be associated with increased engagement compared to medium or low personalization.

➤ **Scenario 2 : Impact of Adaptation of Personalized Learning Materials on Engagement**

Table 2 – ANOVA for Engagement Levels based on Adaptation of Personalized Learning Materials

Source of Variation	df	SS	MS	F-value	p-value
Between Groups (High, Medium, Low Adaptation)	2	98.5	49.25	10.42	< .01
Within Groups	297	1401.6	4.72		
Total	299	1500.1			

In **Table 2**, the F-value is 10.42 and the p-value is less than 0.01, indicating that the differences in engagement levels based on the adaptation of personalized learning materials are statistically significant.

**Interpretation:** The manner in which the learning materials are adapted (highly, moderately, or minimally) has a tangible impact on student engagement. Highly adapted content, tailored to students' preferences and backgrounds, leads to a more pronounced engagement than content that undergoes less adaptation.

➤ **Scenario 3: Interaction between Personalized Learning Materials and Adaptation**

Table 3 – Interaction between Personalized Learning Materials and Adaptation

Source of Variation	df	SS	MS	F-value	p-value
Personalization	2	85.6	42.8		
Adaptation	2	82.7	41.35		
Personalization x Adaptation	4	91.46	22.87	5.73	< .05
Error (Within Groups)	287	1145.8	3.99		
Total	299	1505.5			

**Table 3** shows a significant interaction effect between personalization and adaptation with an F-value of 5.73 and a p-value less than 0.05. This interaction effect indicates that personalization's impact on engagement is not consistent across all levels of adaptation.

**Interpretation:** The synergy between the degree of personalization and the level of content adaptation is crucial. For instance, students who experienced high levels of personalized materials that were also highly adapted demonstrated the highest engagement. In contrast, simply having high personalization, without effective adaptation, might not yield the same peak engagement. This underscores the importance of not only providing personalized content but also ensuring its adaptation aligns with students' unique learning needs.

**3.5. Discussion**

The ANOVA analysis's findings provide compelling evidence about the multifaceted connections between personalized learning materials, their adaptation, and student engagement.

***The Centrality of Personalization***

The pronounced differences in engagement levels across varying degrees of personalization, as seen in Table 1, echo a long-standing pedagogical perspective:

the significance of aligning educational materials with learners' unique profiles. In an era where standardization often dominates educational settings, our findings underscore the benefits of moving in the opposite direction, towards increased personalization. A possible explanation for the marked rise in engagement with higher personalization might lie in the learner's perception of relevance. When students perceive materials as being tailored to their interests, backgrounds, or abilities, are likely to find the content more relatable and engaging.

### ***Adaptation: A Complementary Pillar to Personalization***

The significant differences in engagement based on adaptation levels, as presented in Table 2, spotlight the integral role of adaptation in maximizing the benefits of personalization. Merely presenting students with personalized content might not be enough. How this content is adapted – whether to fit different learning styles, backgrounds, or preferences – can significantly augment or diminish its impact. Tailored adaptation ensures that the content aligns with the learner's profile, and their learning journey.

### ***The Synergy of Personalization and Adaptation***

Perhaps the most enlightening insight comes from the interaction between personalization and adaptation, as highlighted in Table 3. The findings suggest that these two elements are not just individual contributors to student engagement but have a collaborative effect. The results resonate with the idea that the most profound levels of engagement are achieved when personalization and adaptation work in pair.

### ***Future Directions***

While our study provides valuable insights, it also raises intriguing questions for future research. For instance, what specific adaptation strategies prove most effective within the realm of computer science? How does the interplay of personalization and adaptation impact long-term retention and real-world application of computer science concepts?

#### 4. Conclusion

In conclusion, this study underscores a pivotal message for educators, curriculum developers, and instructional designer to foster optimal engagement, it's not just about what the content is provided, but also the presentation. As education advances in the 21st century, placing the learner at the center of the experience and adapting to their journey remains paramount.

This study's findings emphasize the potential benefits of reusing resources from OERs into computer science curricula and the significance of personalizing content to suit individual learning needs. While the relationship between OER utilization and enhanced student engagement was evident, the role of resource reappropriation in influencing learning outcomes requires further exploration.

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