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RELATIVE EFFECTIVENESS OF BLENDED LEARNING MODELS ON PRE-SERVICE TEACHERS' LEARNING OUTCOMES IN ACCOUNTING EDUCATION, FEDERAL COLLEGE OF EDUCATION (T), AKOKA, LAGOS

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Abstract
This study investigated the relative effectiveness of four blended learning models, Flex, Rotation, Online Laboratory, and Face-to-Face, on the interest levels of pre-service accounting teachers in Southwest Nigeria. Drawing on the CIPP and Kirkpatrick evaluation models, the research employed a quasi-experimental design with non-equivalent pretest-posttest control groups. A total of 49 NCE II pre-service accounting teachers at the Federal College of Education (Technical), Akoka, were purposively sampled and randomly assigned to the four treatment conditions. Data were collected using the Interest to Learn Financial Accounting Questionnaire (ILFAQ), with a Cronbach's alpha reliability coefficient of 0.84. Analysis of covariance (ANCOVA) was used to test the study's hypotheses at a 0.05 level of significance. Results indicated that the Rotation model was most effective in enhancing learners' interest, followed by Flex and Online Lab models, while the traditional Face-to-Face approach was the least effective. Additionally, gender was found to have a significant effect on interest, with male participants exhibiting slightly higher mean gains than their female counterparts. The study underscores the importance of adopting pedagogically sound blended learning strategies to improve engagement and interest among pre-service accounting teachers. It concludes that blending instructional approaches, tailored to context and learner profiles, can promote sustained interest in financial accounting education, thus contributing to the development of competent and motivated future educators.

Keywords: Blended Learning, Pre-Service Teachers, Financial Accounting, Instructional Models, Interest Development

INTRODUCTION

Technology has transformed education over the last few decades, particularly through the adoption of blended learning. Digital devices such as computers and smartphones are now central to how students communicate, access information, and learn (Valtonen et al., 2021; Ahmed & Opoku, 2022). Unlike teacher-centered methods, which are limited by rigid schedules, passive learning, and a lack of engagement (Rafiq, 2020; Igwe, 2021), blended learning integrates online and face-to-face experiences, creating flexible and student-centered environments (Torrisi-Steele, 2011).

Statement of the Problem

Traditional lecture-based teaching methods remain dominant in Nigerian Colleges of Education (COEs), especially in South-West

institutions, where pre-service accounting teachers are trained (Jimoh & Adebayo, 2017). These teacher-centered methods continue to promote rote memorization, low motivation, and weak practical competencies, which are inconsistent with the demands of modern accounting education (Haseeb & Hassan, 2022). This persistent mismatch undermines the goals of the Nigeria Certificate in Education (NCE) programme, which emphasizes ICT competence, scientific knowledge, and innovative pedagogy for effective teaching and learning (NCCE, 2020). Although blended learning has been shown globally to improve engagement, digital skills, and learning outcomes, there is limited empirical evidence on how different blended learning models specifically influence pre-service accounting teachers in Nigerian Colleges of Education. The research gap lies not only in the inadequate use of blended learning but also in the absence of comparative evidence on the relative effectiveness of models such as Rotation, Flex, Online-Laboratory, and Face-to-Face driver. Therefore, as a researcher, it becomes necessary to systematically evaluate and compare these blended learning models to determine which approach best enhances interest and learning among pre-service accounting teachers and to provide evidence-based guidance for instructional improvement.

LITERATURE REVIEW

Blended Learning

Blended learning is designed to address these shortcomings by harmonizing online tools with classroom teaching. It enhances flexibility, accessibility, and engagement while maintaining opportunities for collaboration and practical skill development (Ali et al., 2018; Picciano, 2009). Different definitions of blended learning have pointed to the fact that blended learning involves the arrangement of traditional and online or computer-mediated teaching methods. Hence, different models have emerged positing different ways in which this arrangement can be achieved. There are various models of blended learning espoused in the literature. Clayton Christensen categorized these models into four classes:

1. Rotation Model of Blended Learning
    i. Station Rotation Model
    ii. Lab Rotation Model
    iii. Flipped Classroom Model
    iv. Individual Rotation Model
2. Flex Model of Blended Learning
3. A La Carte Model of Blended Learning
4. Enriched Virtual Model of Blended Learning

The model is presented diagrammatically below:

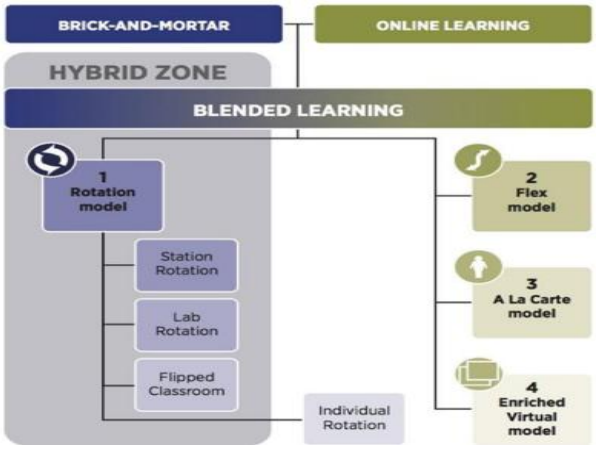

Figure 1: *Horn and Staker (2014) Model of Blended Learning*

Source: Ossian Nilsson (2017)

However, out of these, four are most feasible in Nigeria's context, which are:

Face-to-Face Driver: integrates lectures with supplementary online resources (Horn & Staker, 2012).

Rotation Model: alternates between classroom and online tasks, improving motivation and teamwork (Yusuf & Adamu, 2022).

Flex Model: emphasizes online delivery with optional teacher support, requiring careful instructional design (Yusuf & Adamu, 2022).

Online Lab Model: combines physical and virtual labs, supporting practical accounting applications (Adeyemi, 2024; Oladipo, 2023).

Blended Learning and Students' Learning Outcomes

Empirical evidence consistently demonstrates the effectiveness of blended learning in improving students' academic achievement, retention, and interest across subject areas. Bupo (2019) found that business education students taught financial accounting through a blended learning approach significantly outperformed those taught with traditional lectures in both achievement and retention. The study further revealed no gender differences, suggesting blended learning benefits both male and female learners equally. Similarly, Ezeanyika and Okigbo (2021) reported that secondary students taught Computer Studies through blended learning achieved higher scores than those taught conventionally, attributing this to increased access to online resources. They also observed gender-based differences in interaction with digital materials.

In mathematics education, Akinoso, Agoro, and Alabi (2020) showed that station-rotation blended learning significantly improved students' achievement, though not their attitudes. Ojaleye and Awofala (2018) likewise found that blended and problem-based learning enhanced students' Algebra performance, with no interaction effects between gender and treatment. At the undergraduate level, Gambari et al. (2018) also confirmed that blended learning groups significantly outperformed control groups, with no gender differences in performance. Further supporting these trends, Setyaningrum (2018) established that blended learning improved secondary students' mathematical understanding, while Lin, Tseng, and Chiang (2016) found that blended learning enhanced both mathematical achievement and attitudes, especially among male students. Earlier research by Acelejado (2011) also indicated that blended learning improved mathematics achievement and motivation among bridging students. Although Yushau and Arabia (2006) reported generally positive attitudes toward blended e-learning, they found no significant attitude change except in computer confidence. Collectively, these studies confirm that blended learning consistently promotes higher achievement and retention, regardless of discipline, with mixed outcomes regarding gender and attitude.

Theoretical Framework

Blended learning, which combines traditional face-to-face instruction with online learning, offers significant potential for enhancing educational outcomes (Thai, De Wever & Valcke, 2020). Hence, this study was guided by two theories, which are the Context, Input, Process, and Product (CIPP) model and Kirkpatrick's model. This is because to effectively design, implement, and evaluate such programs, applying robust frameworks like the CIPP and Kirkpatrick models is essential (Caley, Williams, Spernaes, Thomas, Behrens & Willson, 2021). The CIPP model ensures a comprehensive evaluation process by analyzing the educational context, resources, implementation, and outcomes, helping institutions make informed decisions about their blended learning initiatives (Thurab-Nkhosi, 2019).

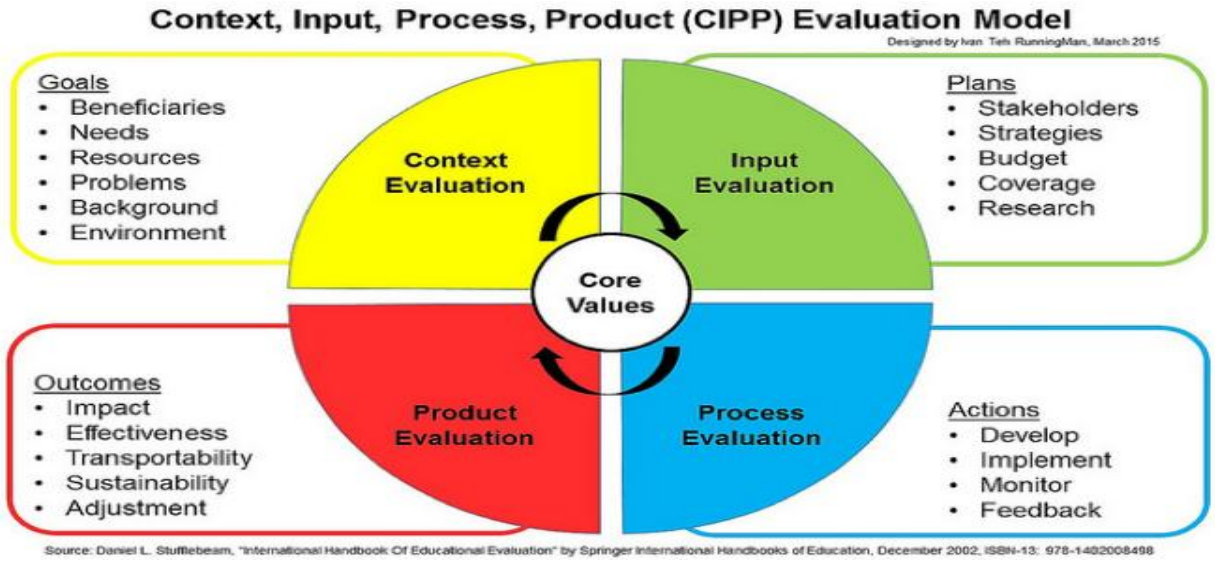

Figure 2: CIPP Evaluation Model
Source: Labibatussolihah, Adriani, Fathiraini & Sumirat (2022)

However, Kirkpatrick's model adds a layer of evaluation, focusing on learners' reactions, the knowledge they gain, how they apply that knowledge, and the broader impact of the program on institutional goals (Kirkpatrick & Kirkpatrick, 2016).

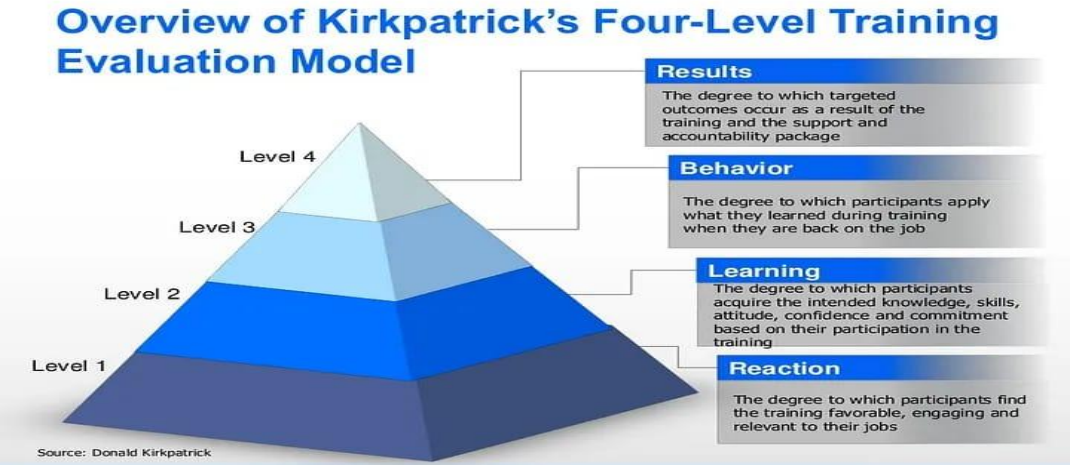

Figure 3: Kirkpatrick Model of Evaluation
Source: KloudLearn (2020)

Together, these models create a holistic framework that supports the effective utilization of blended learning as a tool for teaching and learning, ensuring that programs are both impactful and continuously improved. Hence, blended learning models have become an indispensable tool in educational practice, given the fact that the new age of teaching and learning is technologically based.

Research Objectives

This study was guided by two specific objectives, which were to:

1. Determine the effect of Blended Learning Models (online-lab, Rotation, Flex, and Face-to-Face) on the College of Education

pre-service accounting teachers' interest in financial accounting.

2. Examine the interaction effect of Blended Learning Models (online-lab, Rotation, Flex, and Face-to-Face) and gender on pre-service accounting teachers' interest towards financial accounting.

Research Questions

The following research questions were answered in the study;

1. What is the effect of Blended Learning Models (online-lab, rotation, flex, and face-to-face) on College of Education pre-service accounting teachers' interest in financial accounting?
2. What is the interaction effect of Blended Learning Models (online-lab, rotation, flex, and face-to-face) and gender on pre-service accounting teachers' interest in financial accounting?

Hypotheses

The following null hypotheses were tested at the .05 level of significance, guiding this study:

H_{01}: There is no significant effect of Blended Learning Models (online-lab, rotation, flex, and face-to-face) on College of Education pre-service accounting teachers' interest in financial accounting.

H_{02}: There is no significant interaction effect of Blended Learning Models (online-lab, rotation, flex, and face-to-face) and gender on pre-service accounting teachers' interest in financial accounting.

METHODOLOGY

The study adopted a quasi-experimental research design, specifically the non-equivalent pretest–posttest control group design. This approach was chosen because it was not feasible to randomly assign students to groups without disrupting academic programmes, hence intact classes were used (Gall, Gall & Borg, 2007). The study was carried out in NCCE-accredited technical colleges in Lagos State, Nigeria, offering accounting education as an option in business education. The study population comprised 320 pre-service business education teachers enrolled at the Federal College of Education (Technical), Akoka, the only government-owned COE offering the NCE II Financial Accounting programme in Lagos State during the 2024/2025 session. A purposive sampling technique was used to select the college, while intact classes were randomly assigned to treatment groups. The final sample size consisted of 49 pre-service accounting teachers distributed into four experimental groups: Flex model (12 students); Face-to-Face Driver (9 students); Rotation model (12 students); and Online-Laboratory model (15 students). Each experimental group had a corresponding control group taught with the traditional method.

Data were collected using the Interest to Learn Financial Accounting Questionnaire (ILFAQ), adapted from Fowler's (2007) Interest to Learn Online Questionnaire. The ILFAQ comprised 37 Likert-type items, redesigned to measure students' interest in financial accounting. Responses were rated on a five-point scale, with reverse scoring applied for negatively worded items. Additional scales assessed duration, proficiency, and satisfaction in learning. The instrument was validated by three experts in educational psychology, English, and accounting education, with minor modifications made. Reliability was established through Cronbach's alpha, yielding a coefficient of 0.84. To minimize teacher variability, regular accounting lecturers in the college taught their own students using researcher-prepared guides. The researcher did not directly administer treatments or instruments. Four teaching manuals were developed, covering identical course content but aligned to each blended learning model (Flex, Face-to-Face, Rotation, Online-Laboratory). Lecturers were trained in the strategies before implementation.

The study followed a structured sequence:

1. Pre-test: The ILFAQ was administered to all groups to collect baseline data on students' interest in financial accounting.
2. Treatment: Over five weeks, each experimental group received instruction through its assigned blended learning model, while control groups were taught using traditional lecture methods. All groups received identical content, with two-hour weekly lessons.
3. Post-test: At the end of treatment, the ILFAQ (with rearranged items) was administered again to measure post-intervention interest levels.

Descriptive statistics (mean scores) were used to answer the research questions. Inferential statistics, specifically Analysis of Variance (ANOVA) and Analysis of Covariance (ANCOVA), were applied to test the study hypotheses and determine significant differences between groups.

RESULTS

Research Question 1: What is the effect of Blended Learning Models (online-lab, rotation, flex, and face-to-face) on College of Education pre-service accounting teachers' interest in financial accounting?

Table 1: Mean of Pretest and Posttest Interest Scores of Groups taught Accounting Concepts

Platforms	N	Pretest $\overline{X}$	SD	Posttest $\overline{X}$	SD	Mean difference
Online-Lab	15	32.61	3.72	42.70	2.69	10.09
Rotation	13	31.70	4.23	46.46	1.54	14.76
Flex	12	31.75	4.14	42.28	2.47	10.05
Face-to-Face	09	33.88	4.92	34.23	2.13	00.34

The analysis of preservice teachers' interest in financial accounting concepts revealed notable differences between the experimental groups before and after the treatment. Before the intervention, the face-to-face group demonstrated the highest pre-test mean score (M = 33.88, SD = 4.92), surpassing the online-lab (M = 32.61, SD = 3.72), rotation (M = 31.70, SD = 4.23), and flex (M = 31.75, SD = 4.14) groups. Following the treatment, a significant shift in interest levels was observed. The groups exposed to alternative teaching methods exhibited markedly higher post-test mean scores compared to the face-to-face group. Specifically, the online-lab group (M = 46.46, SD = 1.54), rotation group (M = 42.70, SD = 2.69), and flex group (M = 42.28, SD = 2.47) all outperformed the face-to-face group (M = 34.23, SD = 2.13) in terms of interest in accounting concepts. The mean differences further underscore the effectiveness of the alternative teaching methods. The rotation group showed the largest improvement (MD = 14.76), followed by the flex group (MD = 10.09) and the online-laboratory group (MD = 10.05). In contrast, the face-to-face group exhibited minimal change (MD = 0.34). The results indicate that the rotation method was most effective in fostering interest in accounting concepts among preservice teachers. Hence, based on the data, the blended learning models, especially the Rotation, Flex, and Online-Lab approaches, proved far more effective than the traditional face-to-face method in increasing pre-service accounting teachers' interest in financial accounting, confirming the effectiveness of the selected blended learning models.

Research Question 2: What is the interaction effect of Blended Learning Models (online-lab, rotation, flex, and face-to-face) and gender on pre-service accounting teachers' interest in financial accounting?

Table 2: Pretest and Posttest Mean Interest Scores of Male and Female Pre-Service Teachers in Financial Accounting

Gender	N	Pretest $\overline{X}$	SD	Posttest $\overline{X}$	SD	Mean difference
Male	029	31.02	4.06	44.15	2.19	13.13
Female	020	32.07	3.09	44.11	2.15	12.07

Analysis of gender differences in pre-service teachers' interest in accounting concepts revealed notable changes from pre-test to post-test (Table 2). Male pre-service teachers demonstrated a pre-test mean interest score of 31.02 (SD = 4.06) and a post-test mean interest score of 44.15 (SD = 2.19), resulting in a mean difference of 13.13. Female pre-service teachers exhibited a pre-test mean interest score of 32.07 (SD = 3.09) and a post-test mean interest score of 44.11 (SD = 2.15), with a mean difference of 12.07. The results indicated that the mean difference for male pre-service teachers (13.13) was higher than that of their female counterparts (12.07). These findings suggest a potential gender effect on the interest levels of pre-service teachers when taught accounting.

Hypotheses

H_{01}: There is no significant effect of Blended Learning Models (online-lab, rotation, flex, and face-to-face) on College of Education pre-service accounting teachers' interest in financial accounting.

Table 3: Analysis of Covariance (ANCOVA) for Test of Significance of Pre-Service Teachers' Interest and Gender in Accounting

Source	SS	Df	MS	F	Sig.
Corrected Model	4652.665[a]	5	1163.166	74.086	.000
Intercept	1778.449	1	1778.449	113.275	.000
Pretest	1070.061	1	1070.061	68.155	.000
Treatment	4.793	3	4.793	.305*	.000
Gender	722.060	1	722.060	17.100	.000
Error	2056.739	038	15.700		
Total	1146983.000	049			
Corrected Total	6709.404	048			

*Significant at ρ< .05

The results of the one-way analysis of covariance (ANCOVA) conducted at the .05 level of significance are presented in Table 3. The ANCOVA revealed a statistically significant main effect of treatment on college of education business education preservice teachers' interest in accounting concepts, $F(3, 38) = 4.793$, $p < .05$. This significant main effect indicates that the mean interest scores differed significantly across the four treatment groups (rotation, flex, online-laboratory, and control) after controlling for the covariate(s). Specifically, the experimental groups exposed to the rotation, flex, and online-laboratory instructional platforms had significantly higher mean interest scores compared to the control group taught using the face-to-face method. Therefore, the null hypothesis stating that there would be no significant main effect of treatment on college of education business education preservice teachers' interest in accounting concepts was rejected at the .05 level of significance. The observed mean differences in interest scores between the experimental groups (rotation, flex, online-laboratory) were unlikely to have occurred by chance alone. Instead, these differences can be attributed to the effect of the instructional platforms used to teach financial accounting concepts. In other words, the rotation, flex, and online-laboratory blended learning models were more effective in improving pre-service teachers' interest in financial accounting concepts than the face-to-face driver model.

H_{02}: There is no significant interaction effect of Blended Learning Models (online-lab, rotation, flex, and face-to-face) and gender on pre-service accounting teachers' interest in financial accounting.

The results of the analysis of covariance (ANCOVA) presented in Table 3 indicated a statistically significant main effect of gender on colleges of education pre-service teachers' interest in accounting, $F(1, 38) = 17.100$, $p < .05$. Thus, the null hypothesis stating no significant main effect of gender on colleges of

education pre-service teachers' interest in accounting was rejected at the .05 level of significance. The mean difference in accounting interest between male and female pre-service teachers, as shown in Table 3, was statistically significant. Therefore, it can be inferred that gender has a significant effect on colleges of education pre-service teachers' interest in accounting concepts after controlling for the covariate(s) and treatment effects.

DISCUSSION OF FINDINGS

The findings of this study strongly align with existing empirical evidence demonstrating the effectiveness of blended learning in enhancing students' engagement and learning outcomes across educational levels. The significant improvement recorded in the Rotation, Flex, and Online-Lab groups compared to the face-to-face method confirms that blended learning models are more effective in stimulating pre-service accounting teachers' interest. This mirrors the conclusions of Bupo (2019), who found that blended learning significantly improved both achievement and retention in financial accounting more than traditional lectures. Similarly, Ezeanyika and Okigbo (2021) reported that students taught through blended learning outperformed those taught conventionally due to increased opportunities to explore digital resources, consistent with the higher post-test means observed in all three blended learning groups in this study.

The superior performance of the Rotation model aligns with Akinoso et al. (2020), who confirmed that station rotation structures enhance learning outcomes by allowing students to engage with content through multiple modalities. Likewise, the positive effects found in this study correspond with findings by Ojaleye and Awofala (2018), Setyaningrum (2018), and Acelejado (2011), who all observed that blended approaches enhanced students' understanding, performance, and motivation. However, regarding gender, the study found a significant effect, with males showing slightly higher gains than females. This partially supports findings by Lin, Tseng, and Chiang (2016), who noted higher motivation among male learners in blended environments, while contrasting with studies such as Bupo (2019) and Gambari et al. (2018), who reported no gender differences. These mixed results echo broader literature showing that gender effects in blended learning are inconsistent and context-dependent.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

By comparing face-to-face, rotation, online, laboratory, and flex blended learning models' instructional approaches, the research offers a nuanced understanding of how different blended learning strategies impact student achievement, attitudes, and interest in financial accounting. The potential to significantly influence the development and implementation of blended learning approaches in accounting education, particularly in the context of pre-service teacher training. Ultimately, this study contributes to the broader field of educational technology and pedagogical innovation, offering evidence-based recommendations for improving the quality and effectiveness of accounting education in higher learning institutions.

Recommendations

The study recommended that:

1. Facilitators should implement a balanced blended learning approach to utilise a mix of face-to-face, rotation, online, and laboratory instructional methods to maximise student engagement.
2. Provide training and resources for instructors to effectively implement and manage various blended learning approaches in their accounting classes without any gender bias.

Suggestion for Further Studies

Based on the findings and Limitations of the current study, the following areas were advanced for future research:

1. Longitudinal Effects of Blended Learning on Interest and Performance: Future research could examine how different blended learning models influence students' interest in financial accounting over a longer period, such as a full academic year, to determine whether the observed post-test improvements are sustained or diminish over time.
2. Blended Learning and Diverse Learner Profiles: Further studies could explore how blended learning models affect students with different learning styles, prior knowledge, or motivational levels, to understand whether certain approaches (e.g., online-lab, rotation, flex) are more effective for specific student subgroups.

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