

Financial Literacy and Inclusive Education: Enhancing Economic Decision-Making Skills Among Students with Special Needs

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ABSTRACT:

Inclusive education is focused not only on equal access to education but also on the acquisition of the necessary life skills to ensure independent life and social-economic involvement. In this research, the authors explore the variation in learning engagement and academic achievement between students with and without special needs through the Open University Learning Analytics Dataset (OULAD). The research design used was a quantitative one, which included descriptive statistics, t-tests, correlation, and regression analysis to analyze trends in participation and outcomes in an online environment. The results show that students with special needs exhibit a slightly lower engagement and performance rates, as well as more withdrawal rates, but the difference between the two is rather small. Engagement and academic performance were found to have a positive but weak relationship indicating that although engagement has an impact on learning results, other variables affect student performance. Regression findings also affirm that engagement has a strong predictive power of performance whereas the disability status is still linked with the disparities in outcomes. On the basis of these results, the research provides an understanding of the significance of incorporating the financial literacy concept into the framework of inclusive education as a tool of developing economic decision-making abilities and fostering independence in students with special needs. The research is valuable in terms of promoting inclusive educational practices by connecting the learning analytics with the overall development of life skills.

Keywords: Inclusive education, Financial literacy, Special needs students, Learning engagement, Economic decision-making

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1. Introduction

Educational equality has also been a fundamental principle of offering equal learning opportunities to all students, including those with special needs. The contemporary method of education emphasizes such life skills enabling individuals to interact in the society, besides academic achievement. Financial literacy is one of such skills that have been identified to be critical in fostering independence, social involvement and health. Financial literacy is the knowledge, skills and attitudes to make responsible financial decisions, which is essential in engaging in daily economic practices and self-reliance (Hidalgo-Mayorga et al., 2025).

Systemic barriers tend to limit access of students with special needs to quality education and training in life skills. The curriculum might not meet their unique learning needs, particularly in such subject areas as financial education, which needs to be contextualised and applied. The literature available demonstrates the necessity of planned, inclusive financial literacy education that takes into account such principles as Universal Design for Learning (UDL) and culturally responsive teaching to make it more accessible to all students (Henning and Johnston-Rodriguez, 2018). Likewise, holistic financial education programs designed for people with disabilities have been demonstrated to have a significant impact on improving their ability for independent living and social engagement (Melo et al., 2023).

The link between inclusive education and economic empowerment also highlights the need for financial literacy in education. Inclusive education enhances not only academic inclusion but also inclusion in the economic sphere by imparting skills to learners (Asongu et al., 2020). Here, financial literacy plays a crucial role in connecting education to economic opportunities for disadvantaged communities. Preliminary studies on people with intellectual and developmental disabilities suggest that financial inclusion is not well achieved due to educational and support system deficiencies (Peguinho et al., 2024).

Recent developments in data-driven and

personalized education approaches have provided opportunities to improve learning experiences for a range of students. At the policy level, there is an increasing focus on using data analytics to enhance inclusive education and inform policy-making (Shivashankar & Bakthavatchaalam, 2024). Moreover, recent models combining financial literacy, entrepreneurship and digital learning technologies demonstrate the role of personalized education in driving inclusive growth (Khan & Akhtar, 2024; Deon & Shah, 2025; Nadeem & Elbert, 2025). These trends indicate that new teaching methods can play a crucial role in meeting the needs of students, including students with special needs.

Individuals' ability to make financial decisions depends on their skills and financial knowledge. Research has shown that financial literacy, digital skills, and independence are crucial factors that affect individuals' economic decision-making and financial well-being (Kumar et al., 2023). Moreover, shifting approaches to measuring financial literacy underline the need to incorporate digital elements to achieve inclusivity in the contemporary economy (Johari, 2025). Furthermore, extending inclusive financial education to diverse and marginalized groups also underscores the significance of financial literacy for empowerment and well-being (Molchan, 2025).

While there is increasing recognition of the significance of financial literacy, there is a lack of empirical evidence on financial literacy in inclusive education for students with special needs. Specifically, little research has explored the relationship between educational engagement and learning outcomes of such students and their readiness for economic decision-making. Closing this gap is crucial to create interventions that go beyond academic achievement to include life skills and independence. So, this research seeks to investigate educational engagement and learning outcomes of students with special needs, and to conceptualize financial literacy as an inclusive educational intervention to improve economic

decision-making. The objectives of this study are:

- To analyze differences in learning engagement between students with and without special needs.
- To examine the impact of engagement on academic performance outcomes.
- To identify learning gaps that may affect students' preparedness for economic decision-making.
- To explore the role of financial literacy as an inclusive intervention for students with special needs.

2. Methods

2.1 Research Design

This study adopts a quantitative research design based on secondary data analysis to examine differences in educational engagement and academic performance between students with and without special needs. The design allows the systematic assessment of the learning behaviors in the context of the inclusive education system and offers a foundation of how these learning patterns can be analyzed in terms of their relationships with the wider range of skills development and decision-making abilities.

2.2 Data Source

This study was based on the Open University Learning Analytics Dataset (OULAD) that included anonymized data of student demographics, online learning engagement, and academic performance in online higher education environments (Anil, 2026). The dataset consists of multiple interconnected tables, from which relevant information was extracted, including `studentInfo` for demographic and disability data, `studentVle` for engagement metrics, and `studentAssessment` for academic performance indicators. A combination of these elements offers an overall perspective of the learning process of students.

2.3 Sample Selection

The sample consists of students enrolled in online courses in the dataset and is divided into two groups based on disability status: students

with special needs and students without special needs. Data entries with missing values in the variables of interest (special needs status, engagement activity, and assessment scores) were removed to ensure data integrity and consistency for analysis. This ensured a data set for a meaningful comparison.

2.4 Variables of the Study

The purpose of the study is to investigate the relationship between disability status, learning engagement and learning achievement. Disability status is the independent variable and is treated as a binary variable to represent students with special needs. Learning engagement is measured by looking at the students' engagement with the virtual learning environment in terms of activities, which counts the students' participation. Learning performance is defined by students' assessment performance and course performance (pass, fail or withdrawn). As well, the background variables of age band, highest qualification, region and socioeconomic background (IMD band) are used to distinguish groups of students.

2.5 Analytical Approach

The analysis interprets patterns of student engagement and academic outcomes as indicators of learning participation and skill development within an inclusive education context. Variations in these indicators provide

insight into differences in students' preparedness for applying knowledge and skills in practical and real-world situations. This approach allows the study to connect educational experiences with broader competencies relevant to independent functioning and decision-making.

2.6 Data Analysis Techniques

Both descriptive and inferential statistics are employed in the study. Descriptive statistics in the form of means, standard deviations and frequencies are used to describe the sample and the key variables. Inferential statistics was used to examine differences in engagement and academic performance between students with special needs and other students using independent sample t-tests. Analysis of variance

(ANOVA) was used to examine differences between demographic variables, if needed. Correlation analysis is carried out to examine the relationships between engagement and academic performance and regression analysis to examine the effect of engagement and demographic factors on academic performance.

3. Results

3.1 Descriptive Statistics

The final analytic sample consisted of 32,593 student-course records, providing a robust basis for examining engagement and performance patterns within an inclusive education context. The proportion of students with special needs in the sample was 9.71% ($n = 3,164$), with 90.29% ($n = 29,429$) being students with no reported

disabilities (see Table 2). Descriptive statistics showed that there was a lot of variation in learning engagement among the sample. The average number of interactions with the virtual learning environment (VLE) was 180.72 ($SD = 675.60$) with the highest and lowest number being 0 and 16,440 clicks, respectively, which reflect the presence of very uneven patterns of participation among students. The mean assessment score of 72.77 ($SD = 16.37$) was used to measure academic performance, and the weight average of 69.70 ($SD = 16.71$) was the measure of weighted scores (see Table 1). These findings emphasize the diversity of engagement and performance, which should be further compared and inferred.

Table 1. Descriptive Statistics of Key Variables

Variable	N	Mean	SD	Min	Max
VLE Engagement (Clicks)	32,593	180.72	675.60	0	16,440
Assessment Score	25,820	72.77	16.37	0	100
Weighted Score	23,484	69.70	16.71	0	100

Table 2. Distribution by Disability Status

Category	Frequency	Percentage
Special Needs	3,164	9.71%
No Special Needs	29,429	90.29%
Total	32,593	100%

3.2 Differences in Learning Engagement

An independent samples comparison was used to investigate the differences in the level of engagement. Table 3 shows that students without special needs had a higher average engagement ($M = 185.25$, $SD = 688.68$) than students with special needs ($M = 138.55$, $SD = 537.15$). This difference was statistically significant ($t = -4.51$, $df = 4365.14$, $p < .001$),

but the magnitude of the effect was low (Cohen $d = -0.07$). This implies that there are some differences in the degree of engagement but the difference is not extreme. As Figure 1 shows, the difference in the average engagement is not very strong, but it is evident, so the participation levels of both groups overlap.

Table 3. Engagement Differences by Disability Status

Group	N	Mean Clicks	SD	t	df	p-value	Cohen's d
Special Needs	3,164	138.55	537.15	-4.51	4365.14	< .001	-0.07
No Special Needs	29,429	185.25	688.68				

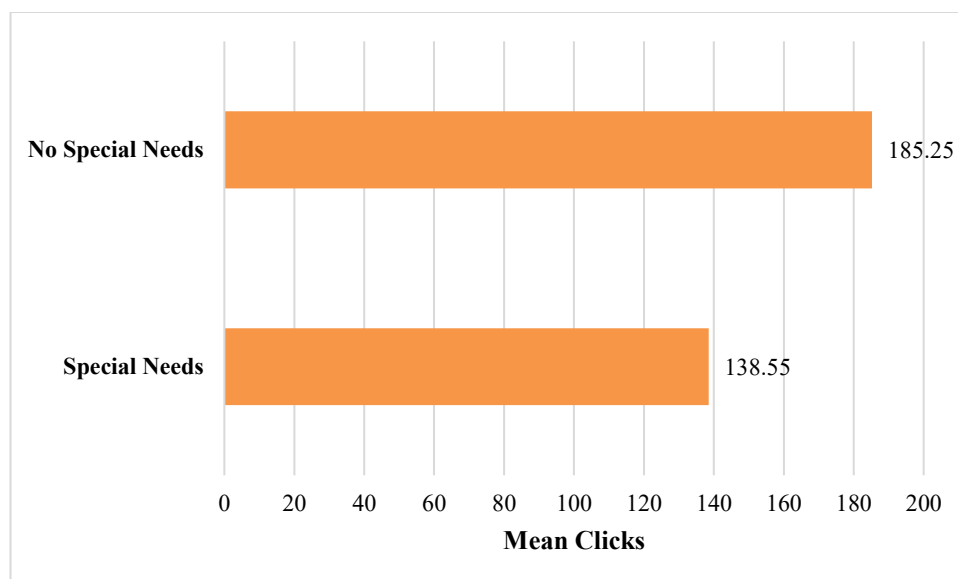


Figure 1. Learning Engagement by Disability Status

3.3 Academic Performance Outcomes

Academic performance analysis showed that there was statistically significant difference between groups. The mean scores (M) were higher in students without special needs (M = 73.05, SD = 16.24) than in students with special needs (M = 70.09, SD = 17.42) (see Table 4). The statistical difference was significant ($t = -7.99$, $df = 2866.58$, $p < .001$) with a small effect size ($d = -0.18$), which meant the performance differences were modest. There were also disparities in final course outcomes. The

percentage of distinctions and passes and the percentage of withdrawals were lower among students with special needs than when it came to students with no special needs (see Table 5). The chi-square test demonstrated that there was a significant relationship between disability condition and course results ($\chi^2 = 138.45$, $p = .001$). Figure 2 depicts an apparent higher rate of withdrawal among students with special needs.

Table 4. Mean Assessment Score by Disability Status

Group	N	Mean Score	SD	t	df	p-value	Cohen's d
Special Needs	2,417	70.09	17.42	-7.99	2866.58	< .001	-0.18
No Special Needs	23,403	73.05	16.24				

Table 5. Final Academic Outcomes by Disability Status

Outcome	Special Needs (%)	No Special Needs (%)
Distinction	7.05%	9.52%
Pass	31.10%	38.66%
Fail	22.50%	21.54%
Withdrawn	39.35%	30.28%

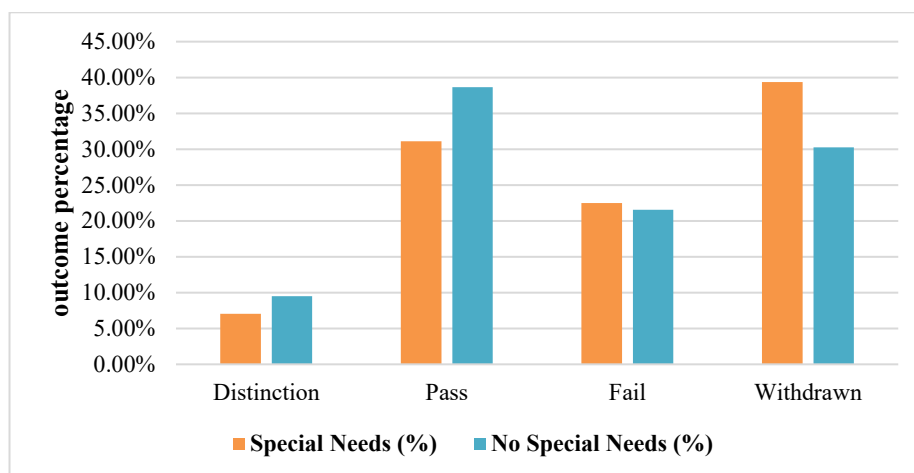


Figure 2. Academic Outcome Distribution

3.4 Relationship Between Engagement and Performance

A weak positive association between engagement and performance was observed when using correlation analysis. VLE clicks positively correlated with mean assessment scores ($r = 0.080$, $p < .001$) as displayed in Table 6. By contrast, there was a strong relationship between mean and weighted scores

($r = 0.923$, $p < .001$), suggesting that the performance measures were consistent. Figure 3 shows a scatter plot with a weak upward trend, which corresponds to the weak but positive relationship between engagement and performance.

Table 6. Correlation Matrix

Variables	Engagement	Score	Weighted Score
Engagement	1.000	0.080***	0.080***
Score	0.080***	1.000	0.923***
Weighted Score	0.080***	0.923***	1.000

* $p < .001$

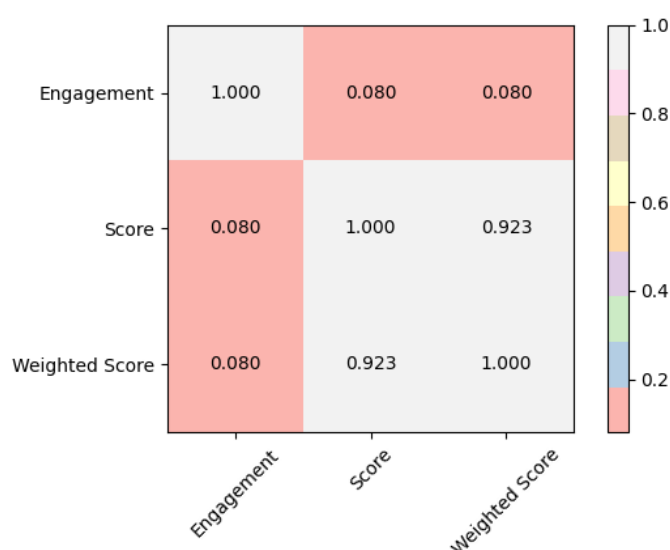


Figure 3. Engagement vs Academic Performance

3.5 Regression Analysis

A regression analysis was used to test the predictive effects of engagement and disability status on academic performance. The findings (Table 7) showed engagement was positively associated ($\beta = 0.247$, $p < .001$) with academic performance, meaning more time spent interacting with course materials leads to better performance. Disability status also showed a

negative association ($\beta = -2.177$, $p < .001$), meaning that students with special needs performed worse, on average, than other students, even when engagement was taken into account. A small amount of variance was explained ($R^2 = 0.032$), suggesting that other factors contribute to academic performance.

Table 7. Regression Results

Variable	Coefficient (β)	Std. Error	p-value
Engagement	0.247	0.034	< .001
Disability Status	-2.177	0.373	< .001
Model R^2	0.032		

4. Discussion

The present study examined differences in learning engagement and academic performance between students with and without special needs and explored how these differences relate to broader competencies associated with economic decision-making. Our findings revealed statistically significant differences in engagement and performance but these differences were mostly small. The results suggest that while students with special needs are engaged in the online learning environment, they might still encounter some structural or pedagogical barriers that might affect their overall learning.

The observed lower engagement levels among students with special needs is in line with the earlier research that has highlighted the challenges in designing inclusive learning environments that can successfully support different learners. The effect size was small, but the decrease in interaction was regular, which suggests that there are certain obstacles in terms of accessibility, pedagogic design or support. The previous studies have stressed that to embed financial literacy into an inclusive learning environment, the teaching strategies need to be deliberately modified according to the cognitive and learning capacities (Merry et al., 2022). This highlights the need for the

learning environment to be created in a way that not only motivates students to get involved, but the involvement itself is meaningful.

Similarly, the findings related to academic performance reveal that students with special needs have a slightly lower performance and higher attrition rates than others. While these are not large differences, there are some consistencies across different indicators that suggest patterns rather than one-off changes. Research has also shown that there is a huge challenge for professionals in providing financial literacy to adults with developmental and intellectual disabilities, particularly in the process of adapting the content to different learning skills (Verma et al., 2025). These can be one of the factors contributing to the performance differences seen in various groups, as students might not be able to appropriately engage with or apply learning materials that are not tailored to their needs.

The observed positive correlation between engagement and academic performance also underlines the important role of engagement in learning processes. The association was fairly low but significant, implying that engagement is only one of the elements that contribute to better performance and not the only one that

determines success. This finding is in line with the literature that suggests that financial literacy of people with intellectual and developmental disabilities needs to be considered not only as content-based but requires also the development of context-based and practical learning opportunities (Kang et al., 2025). So, it is likely that engagement can be insufficient without having teaching

practices that enhance skills and knowledge.

The regression analysis provided more insights into the role of engagement and disability status in academic performance. While engagement was identified as a strong positive predictor, even after taking other factors into account, disability status was a negative predictor. This suggests that the differences in outcome cannot be explained by engagement alone and perhaps to other more general areas of concern such as accessibility, design of instruction and support systems. The views of teachers also highlight the need for special training and inclusive teaching in the financial literacy education of students with special needs including hearing impairment (Khan et al., 2024). These insights provide an indication of the need to equip teachers with the needed skills to cater to the diverse learning needs.

The differences in the completion rates, particularly the withdrawal of students with special needs is also significant. These findings demonstrate that retention is an issue in the context of inclusive education. Existing research has demonstrated that financial literacy programs can have a positive effect on behavioural outcomes such as persistence and decision-making given the boost in confidence and skills of the participants (Mancone et al., 2024). Thus, the inclusion of financial literacy into the schools curriculum can result in not only the improvement in academic performance but also in retention and interest in learning.

Collectively, findings from this study suggest the need to consider indicators beyond the traditional educational outcomes and to focus on the development of broader skills in the area of inclusive education. In this regard, financial literacy is one of the key skills, which allow independent life and economic participation.

Evidence also shows that students' financial literacy can lead to a sustainable economic inclusion by making decisions and participating in the society (Johnson & Iwu, 2026). Thus, the inclusion of financial literacy in the design of inclusive education can be considered as a way of addressing the issues of educational and socio-economic inequality.

Overall, the results indicate that while there are some differences in participation and achievement between students with and without special needs, they are not massive. With appropriate teaching design, interventions and inclusive teaching strategies, one can create learning environments that can facilitate academic performance and development of other life skills. Providing financial literacy opportunities in these classrooms is an effective way to enhance economic decision-making skills and promote sustainable independence of special needs students.

5. Conclusion

Inclusive education refers to not only supporting students to achieve their academic potential, but teaching them the necessary life skills to be able to navigate and engage as a member of the community. This study's results suggest that students with special needs have slightly lower engagement and performance, and higher attrition rates, than their peers. Although these differences are relatively small, their consistency suggests the presence of structural and pedagogical challenges within current educational environments. The results also show that student engagement is an important predictor of academic performance. But its low explanatory power implies that it cannot explain performance differences. Accessibility, design, and support measures will likely play a role in the learning experiences of students with special needs, and need to be taken into account to improve inclusivity. In this regard, financial literacy is an important aspect of inclusive education. The acquisition of financial knowledge and decision-making skills can help students with special needs gain greater autonomy, confidence and economic participation in the future. Thus, incorporating financial literacy education can help address

both academic and life-skill disparities. In conclusion, the results indicate the need for more holistic and inclusive educational strategies that focus not only on academic achievement but also on skills needed to make

meaningful decisions in the real world. Improving these approaches can help to ensure equitable and sustainable learning outcomes for students with special needs.

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