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Research Article

Competing with Media Richness: Cognitive and Psychological Endowment Effects as the Fundamentally Pervasive Perspective of Learning Performance

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This study investigates the students' behaviour, especially regarding their cognitive and psychological endowments' effect on their cognitive absorption, attachment comprehensivity, and learning achievement through various types of learning media. Specifically, it highlights that the resulting learning performance fundamentally starts from individual endowment positions, regardless of the available types of learning media. The authors find that the cognitive and psychological endowments' functional superiority dominates the learning achievement compared to the MR role types. Furthermore, we demonstrate that individuals' beliefs, attitudes, and behaviour are superior to their cognitive and psychological endowments because motivation, inner spirit, and faithfulness in appropriation defeat their material knowledge acquisition in their learning processes, such as absorption, achievement, and attachment. This research presents its novelty through learning attachment behaviour due to supremely personal psychological and cognitive endowment effects. Furthermore, the students with the highest negative experiences impact low absorption, comprehensive attachment, and learning achievement. Finally, the authors reveal that individually endowed mindsets and attitudes contribute to higher learning performance than the MR role types. Thus, it demonstrates that the MR role types produce a low incremental performance, which is nothing more than maximising valuable information.

1. Introduction

This study demonstrates the continuous development of learning media, producing various types to optimise user knowledge dissemination and absorption. However, learning issues continue to multiply behind efforts to maximise MR, such as technostress and digital distraction [1–3]. In addition, there is a disparity between the previous literature, which states that MR improves different students' learning outcomes [4–7]. On the other hand, Cole [8], Cole et al. [9], Fendler et al. [10], and Thompson and Mazer [11] explained that learning achievement was not based on a high MR role type, or methods or teaching-learning models but on their positive-belief, motivation, and mindset. However, this study positions itself on the endowed positive mindset and attitude toward one's learning attachment, cognitive absorption, and learning achievement. Specifically, it emphasises that the growth of learning performance starts from a person's high cognitive belief, which is then internalised and actualised in their learning attachment behaviour. Furthermore, it explores the consistency of the relationship between the students' endowment effects and their learning performance, dominating the MR role type, complexity, and the quality of the learning media.

This research constructively presents an updated argument about students' initial beliefs, attitudes, and behaviour, which determine their learning performance. First, this study argues that the MR role types could optimally improve individuals' learning performance but are inferior to the ignition of their cognitive and psychological capabilities. Furthermore, it highlights that a person's cognitive and psychological endowments are the supreme keys to high or low

levels of absorbed learning materials and comprehensive attachment [9, 10, 12]. Specifically, this study argues that a positive endowment affects the individuals' growth mindset that has been internalised, formerly constructing their mental security, leading to the continuous improvement of the learning goals and objectives [11, 13, 14]. On the other hand, it shows that students' negative endowment affects their adverse beliefs as an initial inception, resulting in their decreased learning performance [8, 15, 16]. Thus, these extant studies signify that control, mastery, and accumulated knowledge give individuals flexibility in identifying the optimal learning methods and media, continuously increasing their ability to absorb knowledge and improve their learning achievement.

Second, this study reveals that the MR role type, as a material transmitter, does not guarantee the individual's learning process, but the learning fulcrum comes from the individual's cognitive involvement [17–19]. Furthermore, the authors argue that MR is only limited to reproducing and adding to the structure of a learning medium by improving its quality and quantity [18, 20, 21]. Therefore, an endowed person's cognitive and psychological capabilities are the primary keys to learning outcomes and attachment. Thus, the authors believe that MR is limited as a material transmitter that helps vary the delivery of information according to and is the preference for the learning media. Third, through the treatment of MR levels as its experimental design, this study is up-to-date in its methodology, describing students' endowment behaviour and their learning performance through an experimental approach to achieving high internal validity and conclusions [9, 22, 23]. Furthermore, this research treats each student as having the natural learning ability to study intermediate accounting materials directly from the text version. Moreover, it categorises these materials into low and high difficulties and reproduces them as motion graphic videos based on the MR concepts. Thus, it demonstrates coherently that a person's cognitive and psychological involvement is a benchmark for their learning achievements, regardless of the many learning media choices that continue to develop.

This article uses structured theories and concepts to explain the students' endowments and learning performances. First, this study considers Chatterjee et al. [24], Morewedge and Giblin [25], and Renaud et al. [26] by concentrating on students' favourable psychological and cognitive endowments because they measure learning performance, such as cognitive absorption, comprehensive attachment learning, and learning achievement which originate from individual endowment effects. Specifically, it places the MR theory as part of this research's methodology to validate the limitation of the MR learning media's framework for improving students' learning performance [10, 27, 28]. Finally, the last theory is the attachment theory, which explains the actualisation of the students' positive endowment effect, attaching their positive belief to the learning process, resulting in their expected learning performance [16, 29, 30]. In other words, this study demonstrates that students must always make coherent efficacy judgments to produce comprehensive knowledge attachments in their learning process.

This study contributes theoretically and practically to the role of MR clarity, significantly regarding the scope of the learning media, endowment effects, and their impact on student learning performance. The first contribution presents a comprehensive approach, measuring the cognitive and psychological endowments [9, 11, 26], constructing the students' learning performance by setting their process and examinations through different types of media [18, 31, 32]. Thus, this study confirms that learning media with matching MR elements are only limited to learning process tools. In addition, measures of the student's cognitive absorption, knowledge attachment, and learning outcomes should be concentrated on their positively enhanced endowment effects, leading to increased self-efficacy, the optimality of their cognitive flow, and a shortening of the learning process.

Second, this study contributes to constructive student behaviour for acquiring knowledge and achieving the targeted learning performance and student-centred learning (SCL) systems. The advanced perspective of students' belief growth is an increase in the positive endowment that makes them adaptively know and process the learning material provided, regardless of the varying MR levels [20, 25, 28]. On the other hand, previously studied material comprehensively attaches knowledge because it focuses more on material that is not yet mastered, known as the reflections of the enhanced students' intelligence [14, 27, 30]. Thus, mindset growth becomes a benchmark for forming positive endowment effects to improve learning performance and SCL outcomes. Moreover, the authors show that the campus, as a learning medium and facilitator, would be responsible for its capacity to improve students' learning achievement. Finally, this study demonstrates that educational system achievement should predominantly incorporate the underlying differences in widespread cognitive and psychological engagement strategies, resulting in secured learning attachments that adapt to various learning media and obtain competitive performance.

2. Literature Review and Hypothesis Development

2.1. Functional Superiority of Cognitive and Psychological Endowments. This study considers Bruner et al. [27], Franciosi et al. [33], and Morewedge and Giblin [25] by explaining that the endowment effect is the individuals' tendency to value one thing as being worth more than other things that they do not have. Furthermore, this tendency is generally referred to as a manifestation of loss aversion. However, Chatterjee et al. [24] differentiate the endowment effect into two extreme points, namely, from a negative perspective, which leads to loss aversion, and from the positive side, which leads to a self-object association. In other words, Chu and Shu [34], Jaeger et al. [35], and Smitizsky et al. [36] reveal that a person's endowment effect comes from his/her initial belief in his/her previously induced knowledge. Furthermore, endowment effects are fundamentally divided into cognitive and psychological endowments, simultaneously reflecting the growth of a person's mindset [16, 27, 36]. Specifically, the cognitive endowment is an

individual's ontological thinking in utilising his/her cognitive capacities and abilities down to loss aversion or self-efficacy [25, 37, 38]. On the other hand, a psychological endowment is an individual's optimism triggered by his/her emotional state and other psychological perspectives, such as the individual's collectivism and perspective-taking, reflected in his/her attitude and behaviour [39–41], which is also often associated with one's self-control [8, 24, 42]. Thus, this study believes that internalising weak (strong) levels of individual self-belief can lead to two opposite adverse (positive) endowment effects.

This study identifies students' cognitive and psychological endowment levels to capture their learning behaviour. Furthermore, it considers Fendler et al. [10], Ishii et al. [18], and Thompson and Mazer [11] to explain the relationship between individuals' endowment effects covering beliefs in their ability to learn and adapt to the various learning methods and media used. Furthermore, the direction of the students' endowment effect establishes good consistency [8, 9, 12] or inconsistency [43–45] to think, causing conflicting behaviour and learning outcomes. Therefore, researchers believe that students' self-belief plays an essential role in learning optimisation, creating flexibility in the learning process. In short, students' positive initial perspectives affect the acceptance level of material, continuously improving their memory, mental strength, and learning comprehensiveness. Thus, students always learn new concepts and theories and gradually increase their readiness to learn and the knowledge in their long-term memory.

2.2. Student Learning Attachment and Performance. Student behaviour is always associated with their thinking capabilities and learning performance. This study also explains the follow-up consequences of the student endowment effect, leading to the comprehensiveness of knowledge attachment and learning performance [13, 15, 46]. Furthermore, this study considers Bosmans et al. [29], Cole et al. [9], and Rusk and Rothbaum [14] to show that students who are attached to a growth mindset generate secure and incremental views. In addition, it clarifies students' learning goals and develops constructive learning strategies and roadmaps for their learning achievement targets. On the other hand, individuals with attached entities and insecure perspectives trigger self-validation goals, decreasing their learning performance. Therefore, this study posits Baum and Owen [47], Sher-Censor et al. [16], Sriwidharmanely et al. [48], and Sumiyana et al. [49], who revealed that students with high-learning abilities could easily understand various levels of material compared to others. Moreover, they continue to make learning achievements, even utilising them in opportunistic conditions. Thus, the authors demonstrate that the student's knowledge comprehensiveness implies their learning outcomes, such as knowledge absorption, satisfaction, and achievement.

Specifically, this study is associated with students' learning behaviour and high-low material attachment power during the learning process, resulting in different learning performance levels. Further, the authors consider Hsu et al. [20], Ishii et al. [18], and Khorakian and Sharifirad [50], who suggest that in the learning process, the student's points of view should be on their own, in comparison with the suitability of the learning media to achieve the targeted learning performance. Thus, this research builds its definition of MR and the components of learning performance. First, MR refers to efforts to effectively deliver learning materials, such as text and explanatory videos, which are positioned as student learning media in this study. Second, cognitive absorption is the ability to absorb during the learning process, reflecting on the knowledge they can capture [10, 51, 52]. Third, learning attachments are based on embedding knowledge comprehensiveness as a cumulative learning outcome. Therefore, a person's attachment power reflects his/her long-term memory and learning capability [14, 24, 46]. Finally, learning achievements refer to the final results of the entire learning series with total size, average examination scores, and completion time from classroom sessions to exams. Finally, this study notifies that absorption ability, material attachment, and learning achievements reflect each student's learning performance.

2.3. Hypothesis Development. Academic performance refers to a certain period, either gradually or accumulated, assessment of student achievement across diverse academic disciplines, which is commonly evaluated through classroom performance, graduation rates, and outcomes from standardised assessments as conducted by educators and educational authorities. In addition to gaining performance, a person's learning achievement is determined by how much intrapersonal [2, 30] and interpersonal [13, 53] abilities continuously influence the experiential learning process through the cognitive and affective capabilities by combining knowledge, skills, and values. Therefore, cognitive and psychological involvement becomes critical to producing maximal learning performance. Furthermore, regarding the primary key to one's learning achievement, some extant research suggests that individuals' learning performance is associated with motivation [30, 37], readiness [44, 49], and maturity [54, 55], as starting points to reach learning success [39, 43, 53]. In other words, this research explains that functional superiority develops when students control their psychological and cognitive endowments to focus on developing cognitive flows concerning the learning material presented, even in various MR. Furthermore, this study builds on the hypotheses below.

H1. Individuals with strong cognitive and psychological endowments produce higher cognitive absorption (H1a), learning achievement (H1b), and learning attachment (H1c) than those with weak ones.

This study does not deny MR's functional role, which enhances the personal understanding of the learning material. In short, MR frames individuals to always be in high cognitive engagement. However, *ceteris paribus*, this study recognises that the functional role of MR without the involvement of students' psychological and cognitive endowment can show their ease in identifying and internalising the material knowledge that is being transformed. Thus, this study develops the hypotheses below.

H2. Individuals with a high MR role type produce higher cognitive absorption (H2a), learning achievement (H2b), and learning attachment (H2c) than those with a low one.

Table 1: Research design.

		Media richness (MR)	
		Video (high MR)	Text (low MR)
Cognitive and psychological endowment	Strong	Cell-A	Cell-C
	Weak	Cell-B	Cell-D

This study shows that games or enigmas result from influence, even though individuals with strong and weak cognitive and psychological endowments and high MR support do not produce a higher learning performance. This study believes that cognitive and psychological endowments have functional superiority in enhancing students' cognitive absorption, learning achievement, and attachment. Moreover, this superiority is supported by the dynamic characteristics of the cognitive and psychological endowments students use to change their adaptation, including motivation and inner spirit support. Finally, this study argues that the MR types are only technological facilitators or transmitter tools. Then, we develop the hypotheses below.

H3a. Individuals with strong cognitive and psychological endowment and with high MR support produce cognitive absorption (H3a1), learning achievement (H3a2), and learning attachment (H3a3) that are the same or not higher than that of those with low MR.

H3b. Individuals with low cognitive and psychological endowment and with low MR support produce cognitive absorption (H3b1), learning achievement (H3b2), and learning attachment (H3b3) that are the same or not lower than that of those with high MR.

3. Research Method

3.1. Research Design and Sampling. By conducting a 2×2 between-subject design with MR formed as texts and videos, this study reflected the sequential logic in achieving supreme learning performance, starting with the student's cognitive and psychological capabilities. In detail, it used intermediate accounting material to embody the MR role types, reflecting that the MR types are limited to learning outlets or tools instead of learning achievement boosters. Additionally, it used academic and vocational high school students in the twelfth grade and college students, especially first-year students, as participants and demonstrated how cognitive and psychological abilities fundamentally evidenced the learning outcomes obtained by the students. Therefore, this study assigned the participants to this study's experimental matrix, as presented in Table 1.

This research sorted and chose MR materials from Kieso et al. [56] and then transformed them from the text role type into the animated video role type. Furthermore, based on the topic and discussion complexities, it categorised the selected materials into low (financial statements) and high (accounting for R&D activities and information systems). Furthermore, it included paragraph thickness as the text role type and duration as the video role type. In short, these classifications fulfilled the MR foundational principle, matching up with and transforming the material's complexity and quality into different role types. Specifically, this article considers Sriwidharmanely et al. [48] and Sumiyana and Sriwidharmanely [3]. It constructed its experimental procedure in several steps. First, the authors made appointments to visit several schools and campuses to ask them to participate, especially during their scheduled accounting courses. In addition, we asked the students to participate via a link on the experimental website that had been prepared previously. Second, before facing the MR material, the participants filled in their data and the questionnaire to cluster them by their low or high cognitive and psychological endowment scores, as shown in Table 2. Third, the authors randomly plotted each participant to face the selected learning materials in texts or videos. Fourth, this experimental procedure required the participants to answer pop-up questions during the learning process provided by the MR role types through texts or videos, as presented in Figure 1.

In particular, these pop-up questions reflected cognitive absorption, learning achievement, and attachment. Furthermore, these pop-up questions were manipulated by each question's difficulty based on low, medium, or high material levels; the video's duration; and condensed phrases in each text. In short, the MR role types and all the pop-up questions were intertwined as one manipulative treatment, resulting in experimentally consequent values. Moreover, each pop-up question intermittently appeared when the participant finished answering the questions, followed by continuing the learning material process. Finally, our design reflected a true experimental design. This research presents this experimental design at https://www.mr1-research.com.

In determining the treatment scores in this study, cognitive absorption measurements were administered three times for each MR material, ensuring high internal validity of the received consequence measurements. Furthermore, the basis for measuring cognitive absorption three times is grounded in an individual's absorption capability when facing learning materials [51, 52]. Moreover, in terms of treatment score weighting, it was determined to achieve the highest score of five, derived from the average score of the wrong, right, and not chosen options. Second, by referring to an individual's behaviour attachment to the learning material when studying [14, 15, 50], learning attachment measurement was presented once, provided in 10 options, five correct and five incorrect. For its score weighting, this measurement is weighted equivalently to the cognitive absorption measure, with a score of five as the highest. Third, learning achievement is assessed through the average final scores and completion times of cognitive absorption and learning attachment [2, 13, 53].

3.2. Testing the Hypotheses. This research tested H1 by comparing the mean values of Cell-A and Cell-C to Cell-B and Cell-D. Then, we searched to see if the mean values of

Table 2: Item questions.

Variables	Questionnaire items
Psychological endowment [57, 58]	I am confident in setting learning goals in my chosen subjects.
	Currently, I perceive myself as fairly successful in my chosen subjects.
	When faced with learning challenges, I can brainstorm various strategies to overcome them.
	I can navigate through tough learning periods because I have encountered various difficulties in the past.
	I consistently focus on the positive aspects of the complexity of the learning material provided.
Cognitive endowment [59, 60]	I am capable of assessing the elements necessary for enhancing knowledge capacity based on the current learning conditions and environment.
	I am capable of assessing the elements necessary for enhancing others' knowledge capacity based on their learning conditions and environment at the time.
	I always allocate time to enhance my learning capacity.
	I consistently allocate time to assist others in improving their learning capacity.
	I continuously seek opportunities to expand and enhance my learning capacity and capabilities as much as possible.

Note: all items were measured using a 5-point Likert scale, with a rating of one (1) indicating "strongly disagree," while a rating of five (5) denoted "strongly agree".

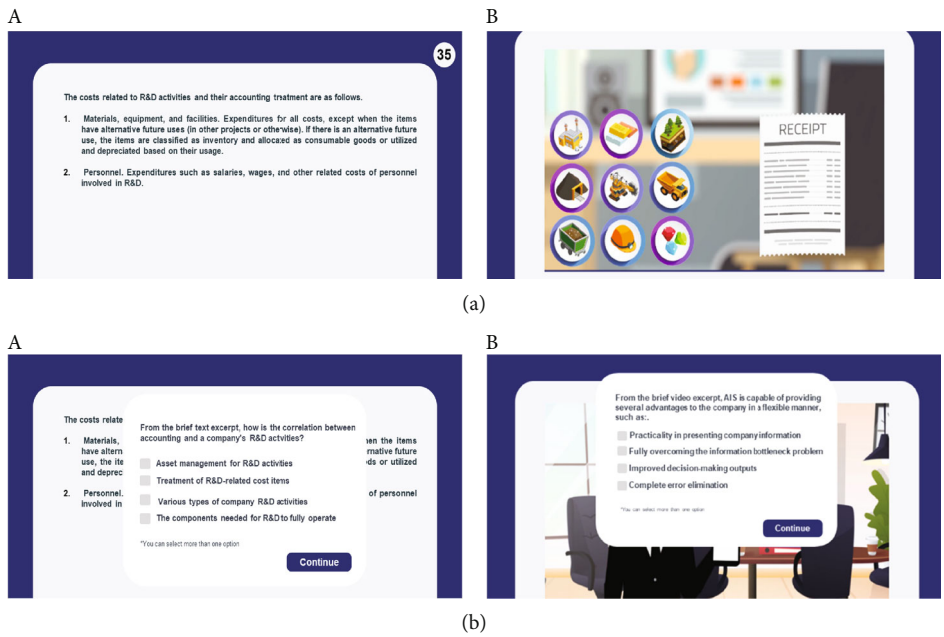

Figure 1: Pictures of experimental procedures. (a) MR-type samples: (A) text and (B) animated video. (b) Pop-up question samples: (A) text and (B) animated video.

Cell-A and Cell-C were higher than Cell-B and Cell-D, considering the cells' standard deviation and data numbers. Secondly, we tested H2 by conducting similar comparisons to those for H1. Thus, our investigation of H2 compared Cell-A and Cell-B to Cell-C and Cell-D. Thirdly, we examined H3a using a three-time comparison, comparing Cell-A to Cell-C, Cell-A to Cell-D, and Cell-A to Cell-C∪D. In these comparisons, the authors identified the null hypotheses, not solely the alternate ones, due to this study's propositions. Finally, we undertook mean comparisons for H3b by comparing Cell-C to Cell-A, Cell-C to Cell-B, and Cell-C to Cell-A∪B, similar to H3a.

4. Statistical Results

4.1. Descriptive Statistics. Table 3 shows the results of the descriptive statistics for each cell, with the participant numbers, mean value, and standard deviation. We identified that the cognitive absorption, learning attachment, and achievement for Cell-A had the highest mean values of 4.103, 3.900, and 4.052 and standard deviations of 0.698, 0.954, and 0.852 in 25 participants. However, we suspect that the values of the descriptive statistics were not significantly different from the other cells, which were close to the same values. Specifically, the authors compared high cognitive

Table 3: Descriptive statistics.

Factors and levels		MR types Treatment scores as consequences: CA, LATT, and LACHV Video (high MR)	Text (low MR)	Total
Psychological and cognitive endowments	Strong	*n*: 25 $\bar{x}$: 4.103, 3.900, 4.052 SD: 0.847, 0.877, 0.680	*n*: 35 $\bar{x}$: 3.947, 3.885, 3.932 SD: 0.764, 0.832, 0.713	*n*: 60 $\bar{x}$: 4.012, 3.766, 3.817 SD: 0.796, 0.875, 0.761
	Weak	*n*: 18 $\bar{x}$: 3.546, 3.333, 3.493 SD: 0.729, 1.000, 0.601	*n*: 33 $\bar{x}$: 3.396, 3.030, 3.304 SD: 0.568, 0.828, 0.516	*n*: 51 $\bar{x}$: 3.379, 3.137, 3.318 SD: 0.671, 0.894, 0.593
	Total	*n*: 43 $\bar{x}$: 3.620, 3.591, 3.613 SD: 0.698, 0.954, 0.852	*n*: 68 $\bar{x}$: 3.579, 3.587, 3.581 SD: 0.735, 0.943, 0.676	*n*: 111 $\bar{x}$: 3.753, 3.545, 3.701 SD: 0.773, 0.942, 0.700

Note: CA: cognitive absorption; LATT: learning attachment; LACHV: learning achievement; *n*: participant numbers; $\bar{x}$: mean value; SD: standard deviation.

and psychological endowments with mean values of 4.012, 3.766, and 3.817 and standard deviations of 0.796, 0.875, and 0.761 in 60 participants. These statistical values exceeded the mean values of the low cognitive and psychological endowment categories of 3.379, 3.137 and 3.318, with standard deviations of 0.671, 0.894, and 0.593 in 51 participants [61, 62]. Furthermore, this research suggested that the descriptive data of the endowment varied sharply with the mean values and standard deviations. On the other hand, the participants clustered by the type of MR role showed that the mean and standard deviation values were not much different, 3.620, 3.591, and 3.613 (0.698, 0.954, and 0.852) compared to 3.579, 3.587, and 3.581 (0.735, 0.943, and 0.676), indicating a lack of power to increase cognitive absorption, learning achievement, and attachment, as this study proposed.

4.2. Validity and Reliability for Measured Variable. This study examined the validity and reliability of the variables that measure cognitive and psychological endowments. Furthermore, regardless of the corrected item-total correlation test criterion mismatch, these statistical results showed that all the loading factor values met the criteria by exceeding 0.5, representing sufficient variance extracted from all the variables. Moreover, the AVE values of each variable were in the range of 0.4-0.5, confirming an acceptable measure of convergent validity. On the other hand, the variable reliability test results showed that the lowest value was 0.651 [63, 64]. Besides this, the lowest reliability value of each item was 0.557, achieving internal consistencies for each item and variable, as presented in Cronbach's alpha section [64–66]. Thus, this study concluded that the cognitive and psychological endowments did meet the reliability and validity standards and could be used to determine the next statistical test. Table 4 presents the results.

4.3. Post Hoc Test Results. The authors checked the successful treatment of the MR role types. Even though this research differentiated them into high and low, it split the consequence values for cognitive absorption, learning achievement, and attachment. Furthermore, it defined treatment success as when the mean values of the three variables were not statistically different by examining the first and last 25 participants as its post hoc test. As a result, this study showed the absolute differences between these groups, followed by insignificant results for all the variables [62, 67], as presented in Table 5. Therefore, the experimental treatment was successful because the variation indicated that all the participants carefully completed the treatment sequence, producing the least experiment-wise errors.

4.4. Mean Comparison Results. This study showed that individuals' cognitive and psychological endowments produced high cognitive absorption, learning achievement, and attachment in Table 6, resulting from comparing the cells shown in Table 4. Specifically, the statistical analysis results showed the mean values for Cell-A&C compared to Cell-B&D, with the mean differences in cognitive absorption (0.6334), learning attachment (0.6294), and learning achievement (0.4991). Moreover, the results of H1's statistics for each variable, cognitive absorption, learning achievement, and attachment, were significant at 1.00%, respectively. Therefore, the statistical results support H1 robustly in the three types of learning performance. On the other hand, these overall results do not support H2a and H2b, as they show slight mean differences for cognitive absorption and learning attachment. Meanwhile, the statistical test supports H2c as the only significant measure (at 10.00%) of learning achievement [68, 69]. Thus, the overall measures exhibited insignificant results and indicated that the MR role types had a minor capacity to reinforce individual learning performance due to a remote chance of H2c being supported.

Finally, the authors showed the final enigma of cognitive and psychological endowments as superior factor capabilities that increased cognitive absorption, learning achievement, and engagement, even though there was support from the MR role types. Therefore, this study searched to support H3a and H3b at this test stage. In particular, by comparing Cell-A with Cell-C, these statistical analyses exhibited insignificant results consistently because these two cell groups contained participants with high endowment levels, representing how inconsequential the differences in the MR role types used by the two groups were. Furthermore, as a result of the comparison of Cell-A with Cell-D and Cell-C&D, both statistical results revealed remarkable mean differences among those cells for all the consequences:

Table 4: Validity and reliability results.

Variables	Item	Factor loading	Corrected item-total correlation	AVE	Cronbach's alpha	
Cognitive endowment	CE1	0.761	0.579	0.544	0.730	0.776
	CE2	0.688	0.512		0.747	
	CE3	0.737	0.549		0.736	
	CE4	0.634	0.460		0.771	
	CE5	0.850	0.699		0.691	
Psychological endowment	PE1	0.738	0.502	0.423	0.557	0.651
	PE2	0.653	0.392		0.605	
	PE3	0.610	0.370		0.614	
	PE4	0.666	0.433		0.585	
	PE5	0.575	0.340		0.631	

Table 5: Post hoc results.

Consequent treatment	Selected sample	Mean (std. dev.)	Mean diff.	(t-value).sig
CA	First 25	3.8267 (0.98187)	0.2800	$(0.272)^{NS}$
	Last 25	3.5467 (0.78730)		
LATT	First 25	3.8800 (1.1390)	0.5000	$(0.095)^{NS}$
	Last 25	3.3800 (0.92736)		
LACHV	First 25	3.8400 (0.90608)	0.3350	$(0.147)^{NS}$
	Last 25	3.5050 (0.68487)		

Note: CA: cognitive absorption; LATT: learning attachment; LACHV: learning achievement. ^{NS}Not significant; ***(1.00%); **(5.00%); *(10.00%).

cognitive absorption (0.7069, 0.4232), learning attachment (0.8697, 0.4294), and achievement (0.7476, 0.4247), and these were followed by the all cell-consequence tests, which were significant at 1.00% [33, 68, 69]. Likewise, the statistical results for H3b amplified H3a's position and this study's arguments by proposing psychological and cognitive endowments as the superlative key role in producing students' learning performances and positioning the MR role types solely as learning facilitators. Ultimately, this study supported H3a and H3b, which meant that the MR role types did not strengthen the students' cognitive and psychological endowments in their capability to determine learning outcomes.

4.5. Robustness Test. Conclusively, we tested this study's robustness with a high-complexity material category included in this treatment by using steps similar to those for testing H3a and H3b in Table 7. Then, the statistical analysis results for H3a revealed its consistency overall, as reflected by the consistently significant level of the three cells' comparison, along with the other two learning performance consequences. Furthermore, although all the robust statistical results for Cell-A to Cell-C&D were insignificant, the remaining cell-consequence testing results for Cell-A compared to Cell-C and Cell-D remained consistent. In addition, the insignificant results of these cells, Cell-A compared to Cell-C&D, were probably due to mixed-characterised participants with low and high psychological-cognitive endowments. Finally, the robust statistical tests from H3b exhibited consistent results [61, 67, 69] as the main H3b results (Table 6), achieving satisfactory experimental design and consequence measurements conducted in this study. In short, these results consistently showed that the MR role types did not have enormous consequences for improving learning performance. Therefore, the statistical test results were proficient, reflecting the robustness of all the identified measures.

5. Discussion and Findings

This study showed that cognitive and psychological endowments dominate in increasing cognitive absorption, learning attachment, and achievement. The difference in support for the high-low endowment suggests that its influence on learning outcomes is fundamental because well-established cognitive abilities have induced it [25, 37, 51]. Meanwhile, the MR role type differs for students' learning outcomes for high-low students. The results of this analysis indicate that MR, as a facilitator and transmitter tool in the learning process, accelerates and clarifies cognitive absorption and learning achievement. Therefore, the dichotomous distinction of high-low MR role types affects students' convenience in adding knowledge to their cognitive abilities [27, 49, 52]. However, this research did not find that students with high cognitive and psychological endowment and high MR showed cognitive absorption and learning achievement that were in contrast to the others. Thus, the authors believe that cognitive and psychological endowments manage the highest supremacy over learning outcomes [24, 29, 53]. Furthermore, this study finds the following distinctive concepts.

Table 6: Mean comparison results.

Hyp.	Mean (std. dev.)	Consequence	Cells	Mean diff.	(t-value).sig
H1a	4.0125 (0.79677) 3.3791 (0.67109)	CA	A&C>B&D	0.6334	(4.546)***
H1b	3.7667 (0.87560) 3.1373 (0.89487)	LATT	A&C>B&D	0.6294	(3.730)***
H1c	3.8177 (0.76176) 3.3186 (0.59375)	LACHV	A&C>B&D	0.4991	(3.875)***
H2a	3.8702 (0.83893) 3.6801 (0.72643)	CA	A&B>C&D	0.1900	(1.223)^{NS}
H2b	3.6628 (0.96190) 3.4706 (0.92994)	LATT	A&B>C&D	0.1922	(1.039)^{NS}
H2c	3.8183 (0.69901) 3.6278 (0.69668)	LACHV	A&B>C&D	0.1906	(1.401)*
H3a	4.1033 (0.84789) 3.9476 (0.76405) 3.3965 (0.56865) 3.6801 (0.72643)	CA	A>C A>D A>C&D	0.1557 0.7069 0.4232	(0.731)^{NS} (3.600)*** (2.215)***
	3.9000 (0.87797) 3.8857 (0.83213) 3.0303 (0.82858) 3.4706 (0.92994)	LATT	A>C A>D A>C&D	0.0143 0.8697 0.4294	(0.064)^{NS} (3.858)*** (2.058)***
	4.0525 (0.68004) 3.9321 (0.71348) 3.3049 (0.51628) 3.6278 (0.69668)	LACHV	A>C A>D A>C&D	0.1204 0.7476 0.4247	(0.662)^{NS} (4.762)*** (2.623)***
H3b	3.9476 (0.76405) 4.1033 (0.84789) 3.5463 (0.72997) 3.8702 (0.83893)	CA	C>A C>B C>A&B	0.1557 0.4013 0.0775	(-0.731)^{NS} (1.865)** (0.426)^{NS}
	3.8857 (0.83213) 3.9000 (0.87797) 3.3333 (1.00000) 3.6628 (0.96190)	LATT	C>A C>B C>A&B	0.0143 0.5524 0.2229	(-0.063)^{NS} (2.012)*** (1.097)^{NS}
	3.9321 (0.71348) 4.0525 (0.68004) 3.4931 (0.60135) 3.8183 (0.69901)	LACHV	C>A C>B C>A&B	0.1204 0.4391 0.1138	(-0.657)^{NS} (2.232)*** (0.709)^{NS}

Note: CA: cognitive absorption; LATT: learning attachment; LACHV: learning achievement. ^{NS}Not significant; ***(1.00%); **(5.00%); *(10.00%).

First, this study found that cognitive and psychological endowments do not affect the MR role types dominantly due to the individual's determined motivation [7, 14, 37] and inner spirit [24, 39, 50]. Furthermore, motivation and an inner spirit develop students' strength for high self-determination [70, 71]. Supporting this self-determination, students with high confidence levels increase their power to induce the knowledge being studied into their cognition [13, 37, 70]. Therefore, this study states that cognitive and psychological endowments play a fundamental role, strengthening their form of ignited cognitive capital, which constructs their beliefs, attitudes, and behaviour in the learning process.

Second, continuing from the first finding, this study explains that cognitive and psychological endowments influence students' adaptive capability in the learning process [72–74]. Then, it reveals that students with cognitive and psychological endowments construct a strong level of

Table 7: Robustness test results.

Hyp.	Mean (std. dev.)	Consequence	Cells	Mean diff.	(t-value).sig
H3a	3.9755 (0.82746)	CA	A>C	0.0445	(-0.190)^{NS}
	4.0200 (0.61014)				
	3.4583 (0.56913)		A>D	0.5172	(2.205)**
	3.7571 (0.64989)		A>C&D	0.2184	(0.984)^{NS}
	3.7941 (0.84887)	LATT	A>C	0.0059	(-0.023)^{NS}
	3.8000 (0.84887)				
	3.0682 (0.60347)		A>D	0.7259	(2.990)***
	3.4574 (0.84887)		A>C&D	0.3367	(1.432)^{NS}
	3.9301 (0.68425)	LACHV	A>C	0.0349	(-0.175)^{NS}
	3.3608 (0.46449)				
	3.9650 (0.55201)		A>D	0.5694	(2.946)***
	3.6822 (0.59190)		A>C&D	0.2480	(1.326)^{NS}
H3b	4.0200 (0.61014)	CA	C>A	0.0445	(0.190)^{NS}
	3.9755 (0.82746)				
	3.4470 (0.64147)		C>B	0.5730	(2.506)**
	3.7679 (0.79199)		C>A&B	0.2521	(1.306)^{NS}
	3.8000 (0.76376)	LATT	C>A	0.0059	(0.023)^{NS}
	3.9000 (0.87797)				
	3.0000 (0.80623)		C>B	0.8000	(2.787)**
	3.4821 (0.90760)		C>A&B	0.3179	(1.384)^{NS}
	3.9650 (0.55201)	LACHV	C>A	0.0349	(0.175)^{NS}
	3.9301 (0.68425)				
	3.3352 (0.51256)		C>B	0.6298	(3.316)***
	3.6964 (0.67993)		C>A&B	0.2686	(1.585)^{NS}

Note: CA: cognitive absorption; LATT: learning attachment; LACHV: learning achievement. ^{NS}Not significant; ***(1.00%); **(5.00%); *(10.00%).

adaptation for themselves. Furthermore, with this strong adaptation, these students behave with the faithfulness of appropriation because they are honest about their knowledge endowment capacity. Consequently, students find it easier to capture the learning material. Thus, we demonstrate that studies with cognitive and psychological endowments reflect the power of the faithfulness of appropriation by reinforcing a high level of self-adaptation [31, 72]. Furthermore, they can capture the learning material with their cognitive absorption, learning achievement, and attachment to this status.

Third, this study finds that combining cognitive and psychological endowments and the MR role type does not show different learning outcomes. This analysis suggests that the MR role types do not empower students to capture knowledge in learning [7, 19, 52]. On the other hand, we reveal that the inability of MR to increase cognitive absorption, learning achievement, and attachment is because the essential characteristics of MR are technological facilitators and transmitter tools [17, 18, 32]. Meanwhile, learning outcomes are driven by the learning ecosystem, where other factors are more numerous and dominant in the natural induction of knowledge into cognitive students [10, 29, 49]. Therefore, we demonstrate that learning processes focus on the knowledge of the transformation process, which takes place perfectly. Hence, this study reveals that the MR role types, within their position in ecosystems, slightly increase students' learning achievement.

Our findings in this study imply that learning outcomes should be prioritised to develop students' cognitive and psychological endowments first. This prioritisation could build students' self-determination because of improved knowledge endowment, innovating their faithfulness of appropriation. Furthermore, acquiring integrity and principled morality through students' faithfulness enhances their adaptive capabilities [49, 72, 75]. Thus, they could capture incremental knowledge by comprehending their endowed knowledge capital. Consequently, we argue that this prioritisation promises the most efficient learning processes due to the incremental propensity of learning enhancement [10, 44, 55]. On the other hand, this study argues that prioritising cognitive and psychological endowments supports learning ecosystems through motivation and inner spirits, emphasising intangible perspectives [2, 5, 37]. Thus, comprehending students' propensity for learning enhancement and emphasising intangible perspectives is the most valuable policy compared to others.

The second implication is that the MR role types are a continuum enigma or contingent status in enhancing students' learning outcomes. However, we then argue that the MR role types depend on the knowledge content of this

medium [12, 19, 21]. Moreover, MR is more likely to be categorised as a technological facilitator or transmitter rather than an igniter of learning performance, in which the MR's role types can continue to help students learn continuously. Furthermore, we argue that enhanced MR role types are developed by matching the information quantity and quality in the designed learning material. Specifically, the material should eliminate various limitations that often arise in a learning medium, such as a lack of nonverbal cues, limited understanding and access to human senses, and a large amount of information [4, 18, 31]. Thus, we demonstrate that the density and coherence of material knowledge content develop the most favourable ecosystems for learning processes, not solely based on the richness of the technological medium.

6. Conclusion, Limitation, and Future Research

This research finds that cognitive and psychological endowments have excellent factors for improving individual learning performance rather than relying on the various MR role types. Furthermore, it concludes that students could easily engage with any learning medium due to focusing on the uncaptured knowledge content in these media. Then, these students with internalised high cognitive and psychological endowments gain experiential values. Likewise, they adaptively recognise and transform their shortcomings with convergent thinking as a high-positive endowment effect. In other words, this study hints that educational systems, mainly in the academic disciplines, must be designed based on SCL to meet the needs of each student individually. Thus, all students would continually improve their learning performance and achieve advanced-solid skills.

This study opens up opportunities for future studies. First, this research's results argue that students' initial beliefs and their cognitive and psychological endowments are functional superiority factors that determine their future learning outcomes. However, cognitive and psychological endowments could enhance their knowledge behaviourally with principled and unprincipled integrity, regardless of these preeminences. Thus, the authors recognise that this study has not covered these preeminences yet. Moreover, each part of the positive-negative continuum of endowments affects individuals' learning attitudes and behaviour differently, such as through adverse selection and moral hazard. Furthermore, although principled and unprincipled morality has the same advanced ability to achieve learning performance, students behave differently, for instance, in their knowledge-sharing and risk-assessment behaviour. Consequently, future research could complement this study's concept by establishing the students' shirking and bonding behaviour. The last possibility is that the authors offer new conceptual future research results that will emerge about advanced endowment issues related to students' wisdom in advantaging their capabilities and competencies. The issue requires psychological maturity to be involved in this future research. It will explain that the endowment effects only focus on achieving Bloom's taxonomy of intellectuality but ignore psychological maturity. Hence, this future research proposes to actualise students' learning capability wisely or heedlessly.

Data Availability

The datasets generated during and/or analysed during the current study are available from the corresponding author upon reasonable request.

Ethical Approval

This study has no ethical issues due to not using human bodies, plants, and animals.

Disclosure

This article is the product of the research project competition at Gadjah Mada University in 2022, achieving the best paper awards.

Conflicts of Interest

The authors declare that they have no conflicting interests.

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