

# SELF-DIRECTED Learning Aptitude and Engagement of Students on Virtual REALITY TECHNOLOGY in A UNIVERSITY IN Jiangxi Province, China

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## ABSTRACT

This study aims to explore the relationship between Nanchang Institute of Technology students' self-directed learning ability and virtual reality technology participation. Research results show that students' self-directed learning abilities (including self-management, motivation, and self-monitoring) are significantly related to behavioral, cognitive, and emotional engagement with virtual reality technology. The age factor has a significant impact on students' self-directed learning ability evaluation, while the gender and grade factors have no significant impact. The self-directed learning approach in virtual reality technology enhances student engagement and provides a more autonomous and immersive learning experience. The study recommends that educators and designers incorporate elements that promote self-management, motivation, and self-monitoring into VR learning environments to improve overall student engagement and learning outcomes.

## KEYWORDS

Self-directed Learning; Virtual Reality Technology; Student Engagement.

## 1. INTRODUCTION

In recent years, technology has been incorporated into university curricula more and more. When considering teachers' perspectives and attitudes, prior knowledge, and transformative learning methodologies, this has created both new opportunities and challenges for student engagement (Blundell et al. 2021).

Virtual reality technology in education has reemerged with the 2019 COVID-19 conference. Many experts believe that the technology will have a considerable impact in their professions, particularly in the teaching of art.

As time evolves and generations of new learners come, the landscape of education and professional development continues to progress into something transformative. The traditional education system faces challenges in meeting the diverse needs of learners. Self-directed learning (SDL) refers to the method in which students study independently or without the help of others in order to complete their own learning objectives, establish goals, carry them out, and evaluate their learning outcomes. With SDL, students take control of their education by deciding for themselves what they need to learn, what their goals are, what materials they need, how they will learn, and what they will learn. Online learning must improve both learning methodologies and learning attitudes, according to Silmy, Arizatul, and Ismi, Ajeng (2018).

Students now have greater autonomy thanks to innovative new instructional techniques. Due to the deeper, more satisfying degree of engagement that this self-directed learning strategy fosters among students, learning goals have dramatically improved. Self-directed learning has become a terrific remedy for the low engagement now observed with remote learning, especially in light of the COVID-19 epidemic. In the past year, 1.6 billion kids have been learning remotely, yet just 25% of students and teachers believe that it is as beneficial as learning in a traditional classroom. The issue of disengagement is severe. However, with the aid of self-directed learning and virtual reality technology, children may learn efficiently from anywhere, whether it be at school or at home (Karatas & Arpacı, 2021).

The factors that might influence higher education institutions' decisions towards blended learning have been looked into by Galvis (2018). One of the reasons is that using various digital resources to expand the learning environments enhances interactions between professors and students as well as among students (Muller et al., 2020).

Student engagement is the psychological dedication and involvement of a student in studying and acquiring the necessary skills. When a person is fully engaged in their work, they aren't even aware of how quickly time passes (Bakker, 2011). It has been observed that those who are actively immersed in their tasks, obligations, roles, and/or assignments frequently produce significantly better outcomes than those who are not.

As a result, academics should focus on chances that could be used to foster student engagement and motivate them to approach their coursework with fervor, immersion, absorption, and dedication. Academic studies have also shown that people who are actively involved in their jobs, responsibilities, positions, and assignments tend to create far better results than those who are not. Students that have a strong potential for self-directed learning are shown to be more involved and engaged in accomplishing their objectives. There are indications that students may not be as engaged in various academic and learning activities as they may be. Engagement is about providing enthusiasm, passion, and dedication.

Digital technologies facilitate self-directed learning and make it simpler to obtain information; yet, in order to successfully manage the ever-increasing amount of information available, students must enhance their information literacy abilities. Being a competent self-directed learner requires having this skill (Kara, 2022).

## **2. STATEMENT OF THE PROBLEM**

The study aims to determine the relationship between the self-directed learning aptitude and engagement of students on virtual reality technology in Nanchang Institute of Technology in China.

Specifically, it will seek to answer the following problems:

(1) What is the demographic profile of the student respondents in terms of:

- 1) Age;
- 2) Sex; and
- 3) Grade level?

(2) What is the assessment of the student respondents on their self-directed learning aptitude in terms of the following:

- 1) self-management;
- 2) motivation; and
- 3) self-monitoring?

- (3) Is there a significant difference in the assessment of the student respondents on their self-directed learning aptitude when they are grouped according to their demographic profile?
- (4) What is the assessment of the student respondents on their engagement on virtual reality technology in terms of the following:
- 1) behavioral engagement;
  - 2) cognitive engagement; and
  - 3) emotional engagement?
- (5) Is there a significant difference in the assessment of student respondents on their engagement on virtual reality technology when they are grouped according to their demographic profile?
- (6) Is there a significant relationship between the self-directed learning aptitude and engagement of student-respondents?
- (7) Based on the findings of the study what inputs for effective implementation of virtual reality modality can be offered?

### **3. HYPOTHESIS**

The following hypotheses will be tested:

- (1) There is no significant difference in the assessment of the student respondents on their self-directed learning aptitude when they are grouped according to their demographic profile.
- (2) There is no significant difference in the assessment of student respondents on their engagement on virtual reality technology when they are grouped according to their demographic profile.
- (3) There is no significant relationship between the self-directed learning aptitude and engagement of student-respondents.

### **4. SCOPE AND DELIMITATION OF THE STUDY**

The study will be conducted to assess by the student-respondents the self-directed learning aptitudes in terms of self-management, motivation and self-monitoring; and student engagement in terms of behavioral engagement, cognitive engagement, and emotional engagement on virtual reality technology. Significant relationship between self-directed learning aptitudes and student engagement on virtual reality technology in education will be determined.

The respondents are the students of Nanchang Institute of Technology, in the Jiangxi province, China.

### **5. RESEARCH DESIGN**

The researcher will utilize the descriptive-comparative-correlational research design. Creswell, John W. and J. David, Creswell. 2018, explain that evaluation research study is a “process used to determine and identify the purpose of the survey research and accordingly, the primary purpose is to answer questions about variables of interest to the researcher. Since the main objective of the study is to assess by the respondents on their self-directed learning aptitude in terms of self-management, motivation; and self-monitoring. Likewise, on their engagement on virtual modality in terms of the behavioral engagement; cognitive engagement; and emotional engagement.

A survey method is the preferred type of approach for this study. In this case, it can be beneficial to acknowledge the advantages of survey designs, through the use of the assessments of the different respondents who have direct knowledge about the assessment of the respondents on their self-directed

learning aptitude in terms of self-management, motivation; and self-monitoring. Likewise, on their engagement on virtual reality technology in terms of the behavioral engagement; cognitive engagement; and emotional engagement.

So, in this study, the researcher will be using student respondents, coming from Nanchang Institute of Technology of Jiangxi province, China.

Likewise, this study is generally quantitative. Quantitative descriptive research design provides a description of an event or define a set of attitudes, opinions, or behaviors that are observed or measured at a given time and environment (Creswell, John W. and J. David, Creswell, 2018). It typically involved large samples. This design will be employed to gather information from the assessment of the respondents on their self-directed learning aptitude in terms of self-management, motivation; and self-monitoring. Likewise, on their engagement on virtual modality in terms of the behavioral engagement; cognitive engagement; and emotional engagement.

## **6. RESEARCH LOCALE**

The locale of the study will be at the Nanchang Institute of Technology of Jiangxi province, China. Nanchang Institute of Technology is a private undergraduate university approved by the Ministry of Education of the people's Republic of China. It is a national model university, a school with characteristics of national defense education, and a project construction unit authorized by the Master of Jiangxi Province during the 14th five-year Plan.

The school was founded in May 1999; in April 2001, it was upgraded to a higher vocational college and named Jiangxi Aerospace Science and Technology Vocational College with the approval of the people's Government of Jiangxi Province; in May 2005, it was upgraded to the first batch of private undergraduate universities in Jiangxi Province with the approval of the Ministry of Education. It was named Nanchang Institute of Technology.

As of March 2023, the school covers an area of more than 3000 mu and the construction area of the school building is more than 900,000 square meters; the total assets of the school reach 2.953 billion yuan, of which the total value of teaching and research instruments and equipment is 224 million yuan; there are 19 teaching colleges and 63 undergraduate majors; there are more than 2000 teaching staff, including more than 1600 full-time teachers and more than 30, 000 full-time students.

As of March 2023, the school has 19 teaching colleges and 63 undergraduate majors, covering eight disciplines: engineering, science, literature, economics, management, art, pedagogy and law.

As of March 2023, the school has more than 1600 full-time teachers, including more than 85% of full-time teachers with master's degree or above and more than 30% of full-time teachers with senior professional titles.

As of March 2021, among the full-time teachers of the school, 10 have received special subsidies from the State Council, 2 are engineering experts with tens of millions of talents from the province in the new century, 1 is a talented engineering expert from Jiangxi Province, 2 are the leaders of middle-aged and young universities in the province, 19 are the backbone teachers of middle-aged and young people in the province, and 2 are provincial teaching teams. Ouyang Ziyuan, chief scientist of the Chinese Lunar Exploration Project and academician of the Chinese Academy of Sciences, has been employed as honorary president of the school. Academician Wang Zikun of the Chinese Academy of Sciences is the honorary director of the academic Committee of the school.

## **7. RESULTS**

### **(1) Profile of the Respondents**

Table 1 shows the demographic profile of the student respondents in terms of their age, and sex.

**Table 1.** Frequency Distribution of the Teacher Respondents' Profile

Profile	Frequency	Percentage
<b>Age</b>		
18 years old	14	8.8%
19 years old	43	26.9%
20 years old	50	31.3%
21 years old	53	33.1%
Total	160	100%
<b>Sex</b>		
Male	78	48.8%
Female	82	51.3%
Total	160	100%
<b>Grade Level</b>		
Grade 1	36	22.5%
Grade 2	15	9.4%
Grade 3	80	50%
Grade 4	29	18.1%
Total	160	100%

In terms of age, fourteen (14) or about 8.8% of the student respondents are 18 years old, forty-three (43) students, constituting 26.9%, are 19 years old, fifty (50) students, representing 31.3%, are 20 years old, while fifty-three (53) students, making up 33.1%, are 21 years old. This means that the majority of the respondents are 21 years old. This may be taken to mean that the respondents are at the appropriate grade level given their age.

In terms of sex, seventy-eight (78) students, accounting for 48.8%, are males, while eighty-two (82) students, comprising 51.3%, are females. This means that the majority of the respondents are females in terms of sex. This may be taken to mean that there are equal number of female and male employees in the company.

In terms of grade level, thirty-six (36) students, making up 22.5%, are in Grade 1, fifteen (15) students, or 9.4%, are in Grade 2, eighty (80) students or 50%, belong to Grade 3. Lastly, twenty-nine (29) students, constituting 18.1%, are in Grade 4. This means that majority of the respondents are in grade 3 of their course. This illustrates that the respondents are in the appropriate grade level given their age.

## (2) Assessment of the Student Respondents on their Self-directed Learning Aptitude

Table 2 to 3.4 show the assessment of the student respondents on their self-directed learning aptitude in terms of self-management, motivation, and self-monitoring.

Taking into consideration the assessment of the student respondents on their self-directed learning aptitude in terms of self-management, the highest mean of 3.66, with the qualitative description of the students strongly agreeing about their self-directed learning aptitude and is interpreted as the student's self-directed learning aptitude in terms of self-management is very good, was found for item 5 which states that the students set up planned solutions to solve their problems. The students' planned solutions to address their problems reflect a commendable level of self-directed learning aptitude, particularly in the realm of self-management. One key aspect of their approach is the careful and strategic setup of solutions. The deliberate planning indicates a proactive attitude towards problem-

solving, showcasing a capacity for foresight and organization. This approach suggests that the students are not merely reactive but are actively taking charge of their learning experiences.

**Table 2.** Assessment of the Student Respondents on their Self-directed Learning Aptitude on Self-Management

	Mean	Qualitative Description	Interpretation
I can always manage to solve difficult computer problems if I try hard enough	3.15	Agree	Good
I am well-organized in my learning	2.91	Agree	Good
I set-up strict time frames to learn something new	3.11	Agree	Good
I have good management skills.	3.21	Agree	Good
I set up planned solutions to solve my problems	3.66	Strongly Agree	Very Good
I can decide about the priority of my work	3.15	Agree	Good
I prefer to plan my own learning	3.67	Strongly Agree	Very Good
I am efficient in managing my time.	3.43	Agree	Good
Composite Mean	3.29	Agree	Good

Legend: 3.51-4.00 Strongly Agree/ Very Good; 2.51-3.50 Agree/ Good; 1.51-2.50 Disagree/ Poor 1.00-1.50 Strongly Disagree/ Very Poor.

Furthermore, the students' ability to set up planned solutions implies a strong sense of initiative and autonomy. This self-driven nature is essential for self-directed learning, as it requires individuals to identify challenges, devise strategies, and implement solutions independently. By demonstrating a proactive stance in addressing problems, the students exhibit a high degree of self-motivation, an essential component of effective self-directed learning.

The quality of the planned solutions also speaks to the students' critical thinking skills. The ability to analyze problems and devise comprehensive strategies indicates a depth of understanding and a thoughtful approach. This analytical prowess is integral to effective self-management in the context of learning, as it enables students to navigate challenges with a well-reasoned and systematic approach.

Moreover, the students' commitment to planned solutions suggests a strong sense of accountability. Effective self-management involves a sense of responsibility for one's own learning journey, and the students' proactive problem-solving indicates a willingness to take ownership of their educational experiences. This level of accountability is a key attribute in fostering a successful self-directed learning aptitude.

In conclusion, the students' setup of planned solutions not only showcases their adeptness in self-management but also highlights their proactive, autonomous, and critical approach to learning. These qualities bode well for their overall self-directed learning aptitude, as they demonstrate a capacity to navigate challenges, take initiative, and assume responsibility for their educational journey.

On the other hand, the lowest mean of 2.91, with the qualitative description of the students agreeing about their self-directed learning aptitude and is interpreted as the student's self-directed learning aptitude in terms of self-management is good, was found for item 2 which states that the students are well-organized in their learning. The students' demonstrated level of organization in their learning activities is indicative of a strong self-directed learning aptitude, particularly in the domain of self-management. The evidence of well-organized learning suggests that these students possess a

structured approach to their educational endeavors. This organizational prowess is a crucial element of effective self-management, as it enables individuals to streamline their efforts, set clear goals, and optimize their learning experiences.

One notable aspect of the students' organizational skills is apparent in their study routines and time management. The ability to allocate time effectively for various tasks and assignments reflects a disciplined approach to learning. This time-management proficiency is a cornerstone of self-management, as it empowers students to prioritize tasks, meet deadlines, and maintain a balanced academic workload. The students' commitment to organizational routines indicates a proactive stance in shaping their learning environment.

Furthermore, the students' well-organized approach extends to their resources and materials. A structured arrangement of study materials, notes, and resources implies a conscientious effort to create an efficient learning environment. This organizational acumen contributes significantly to effective self-management, as students can easily access and utilize relevant materials, fostering a smoother and more focused learning experience.

Additionally, the students' ability to set and track their learning goals is a testament to their organizational skills. Clear and defined objectives provide a roadmap for their educational journey, allowing for a more purposeful and directed approach to learning. This goal-oriented mindset aligns with the principles of self-directed learning, emphasizing the students' ability to take charge of their academic progress and tailor their learning experiences to meet their individual needs.

In conclusion, the students' well-organized approach to learning signifies a commendable level of self-management and self-directed learning aptitude. Their proficiency in time management, organizational routines, and goal setting reflects a conscious effort to structure their educational journey proactively. Overall, the students' organizational skills contribute significantly to their ability to manage their learning independently and make informed decisions about their academic pursuits.

The overall mean of 3.29 shows that the students agree about their self-directed learning aptitude and shows that the student's self-directed learning aptitude in terms of self-management is good. A student's self-directed learning aptitude, particularly in terms of self-management, reflects their ability to take ownership of their educational journey, make informed decisions, and effectively organize their learning experiences. A key indicator of good self-management within the context of self-directed learning is the student's capacity to set and pursue goals autonomously. This involves not only establishing clear objectives but also developing a strategic plan to achieve them. A student with strong self-management skills demonstrates a proactive approach in defining their learning path, considering their strengths, weaknesses, and preferences.

Effective time management is another crucial aspect of a student's self-directed learning aptitude. A student who excels in self-management allocates time efficiently, prioritizing tasks based on importance and deadlines. This skill allows for a balanced distribution of effort across various subjects and assignments, reducing the likelihood of last-minute rushes or incomplete work. By successfully managing their time, students can engage in in-depth exploration of topics, undertake additional research, and delve into areas of personal interest, all contributing to a more comprehensive and enriching learning experience.

Furthermore, the ability to organize and utilize resources is a hallmark of good self-management in self-directed learning. A student adept at self-management maintains an organized system for class notes, textbooks, online resources, and any supplementary materials. This organizational proficiency not only facilitates efficient studying but also enables quick access to relevant information when needed. Such students are likely to create effective study environments, minimizing distractions and optimizing conditions for focused learning.

In addition to goal-setting, time management, and resource organization, adaptability and resilience are vital aspects of self-management within self-directed learning. Students who can adjust their

strategies in response to challenges, setbacks, or changes in their academic environment demonstrate a high level of adaptability. This resilience ensures that they can navigate unforeseen obstacles, learn from experiences, and persist in their pursuit of knowledge, enhancing their overall self-directed learning aptitude.

Ultimately, a student's good self-management skills in the context of self-directed learning empower them to take charge of their education, make thoughtful choices, and navigate the complexities of the learning process independently. This aptitude not only fosters academic success but also cultivates a mindset of lifelong learning and a capacity for continuous self-improvement.

**Table 3.** Assessment of the Student Respondents on their Self-directed Learning Aptitude on Motivation

	Mean	Qualitative Description	Interpretation
1. I take the challenge to learn	2.99	Agree	Good
2. I am a “why” person.	3.19	Agree	Good
3. I critically evaluate the level of my learning progress	3.60	Strongly Agree	Very Good
4. I would like to learn from my mistakes	3.09	Agree	Good
5. I believe in effort to improve my performance.	3.20	Agree	Good
6. I enjoy learning new things.	3.61	Strongly Agree	Very Good
7. I trust my abilities to learn new things.	3.60	Strongly Agree	Very Good
8. I have positive expectation about what I am learning.	3.39	Agree	Good
<b>Composite Mean</b>	<b>3.33</b>	<b>Agree</b>	<b>Good</b>

Legend: 3.51-4.00 Strongly Agree/ Very Good; 2.51-3.50 Agree/ Good; 1.51-2.50 Disagree/ Poor 1.00-1.50 Strongly Disagree/ Very Poor.

Taking into consideration the assessment of the student respondents on their self-directed learning aptitude in terms of motivation, the highest mean of 3.61, with the qualitative description of the students strongly agreeing about their self-directed learning aptitude and is interpreted as the student’s self-directed learning aptitude in terms of motivation is very good, was found for item 6 which states that the students enjoy learning new things. The students' evident enjoyment of learning new things is a significant indicator of their high motivation, a crucial element in self-directed learning aptitude. When students derive pleasure from the learning process, it signifies an intrinsic motivation that goes beyond external rewards. This intrinsic motivation is a powerful driving force, fueling their desire to explore, discover, and acquire knowledge autonomously. The joy derived from learning becomes a self-sustaining factor that propels the students towards continuous intellectual growth.

The positive relationship between the students' enjoyment of learning and their self-directed learning aptitude is apparent in their proactive engagement with educational material. When students find joy in acquiring new knowledge, they are more likely to take the initiative in seeking out additional information beyond the standard curriculum. This intrinsic motivation leads to a deeper and more meaningful understanding of subjects, as the students willingly invest time and effort into exploring topics that capture their interest.

Moreover, the students' enthusiasm for learning new things fosters a sense of curiosity and a willingness to take intellectual risks. A self-directed learner is often characterized by their curiosity-driven exploration of diverse subjects. The students' enjoyment of learning is a catalyst for this curiosity, prompting them to delve into unfamiliar territories, ask questions, and seek answers independently. This proactive approach aligns with the principles of self-directed learning, where motivation plays a pivotal role in driving the learning process.

The positive emotional connection to learning also contributes to the students' persistence and resilience. When faced with challenges or setbacks, students with a high level of motivation are more likely to persevere, viewing obstacles as opportunities for growth rather than insurmountable barriers. This resilience is a key component of self-directed learning, as it enables students to navigate difficulties, adapt to changing circumstances, and maintain a long-term commitment to their educational pursuits.

In conclusion, the students' enjoyment of learning new things serves as a powerful motivator that strongly influences their self-directed learning aptitude. The intrinsic motivation derived from the joy of learning propels them towards proactive engagement, deep exploration of subjects, and a resilient mindset. This positive connection to the learning process not only enhances their academic performance but also cultivates a lifelong love for learning, fostering a self-directed approach to education.

On the other hand, the lowest mean of 3.09, with the qualitative description of the students agreeing about their self-directed learning aptitude and is interpreted as the student's self-directed learning aptitude in terms of motivation is good, was found for item 4 which states that the students would like to learn from their mistakes. The students' desire to learn from their mistakes is a significant reflection of their strong motivation, contributing to a positive self-directed learning aptitude. Embracing mistakes as valuable learning opportunities is indicative of an intrinsic motivation to improve and refine one's understanding of a subject. When students actively seek lessons from their errors, it demonstrates a growth mindset and a commitment to continuous improvement, essential components of successful self-directed learning.

The link between the students' willingness to learn from mistakes and their motivation becomes evident in their proactive approach to self-assessment. Rather than viewing errors as failures, motivated learners recognize them as stepping stones towards mastery. This mindset aligns with the principles of self-directed learning, where the ability to reflect on one's performance, identify areas for improvement, and take intentional steps towards enhancement is crucial. This self-reflective practice is a testament to the students' intrinsic motivation to excel in their academic pursuits.

Moreover, the students' openness to learning from mistakes contributes to the development of resilience and perseverance. In a self-directed learning context, encountering challenges and setbacks is inevitable, and the ability to bounce back from these experiences is vital. Students with good motivation not only accept their mistakes but also view them as part of the learning process. This resilience enables them to persist in the face of difficulties, maintaining a positive attitude and an unwavering commitment to their educational goals.

Furthermore, the desire to learn from mistakes fosters a sense of autonomy and responsibility. Self-directed learners take ownership of their learning journey, actively seeking ways to enhance their understanding and skills. When students express a genuine interest in understanding where they went wrong and how they can improve, it demonstrates a high level of self-motivation. This intrinsic drive to take charge of their own learning contributes significantly to their overall self-directed learning aptitude.

In conclusion, the students' inclination to learn from their mistakes is closely tied to their strong motivation and positively influences their self-directed learning aptitude. The willingness to embrace errors as learning opportunities, engage in self-assessment, exhibit resilience, and take ownership of

their learning journey collectively indicate a proactive and motivated approach to education. This mindset not only enhances academic performance but also establishes a foundation for a lifelong commitment to self-directed learning and continuous improvement.

The overall mean of 3.33 shows that the students agree about their self-directed learning aptitude and shows that the student's self-directed learning aptitude in terms of motivation is good. A student with a strong self-directed learning aptitude, particularly marked by a high level of motivation, demonstrates several key attributes that contribute to their overall success in independent learning. Firstly, intrinsic motivation serves as a powerful driving force behind a student's self-directed learning journey. This form of motivation originates from a genuine interest and enjoyment in the learning process itself rather than external rewards. When a student is intrinsically motivated, they are more likely to engage in learning activities voluntarily, actively seek out new information, and persist in the face of challenges.

Motivated self-directed learners exhibit a proactive attitude towards their educational endeavors. This proactive approach involves setting and pursuing personal learning goals, seeking additional resources beyond the standard curriculum, and exploring topics of interest independently. The desire to take charge of one's learning experience is a clear manifestation of strong motivation and is a fundamental aspect of self-directed learning. Motivated students tend to be more goal-oriented, shaping their educational journey according to their unique interests and aspirations.

Furthermore, a good self-directed learning aptitude in terms of motivation is closely tied to a positive attitude towards challenges and setbacks. Motivated learners view obstacles not as insurmountable barriers but as opportunities for growth and improvement. They understand that facing difficulties is an inherent part of the learning process and are more likely to persevere through setbacks. This resilience contributes significantly to their ability to navigate the uncertainties of self-directed learning, allowing them to adapt to changing circumstances and maintain a steadfast commitment to their educational pursuits.

Motivated self-directed learners also exhibit a strong sense of autonomy and responsibility for their learning journey. They actively seek out resources, set their own schedules, and take ownership of their educational goals. This autonomy goes hand in hand with self-management skills, enabling students to organize their time effectively, create conducive learning environments, and make informed decisions about their academic pursuits. The ability to manage oneself independently is a key indicator of a student's self-directed learning aptitude, and motivation plays a pivotal role in driving these self-management skills.

In conclusion, a student with a good self-directed learning aptitude, particularly in terms of motivation, is characterized by intrinsic motivation, a proactive approach to learning, resilience in the face of challenges, and a strong sense of autonomy. These qualities collectively contribute to a dynamic and effective approach to independent learning, fostering not only academic success but also a lifelong love for learning and continuous personal development. A well-motivated self-directed learner is equipped with the mindset and skills necessary to navigate the complexities of education and thrive in various learning environments.

## **8. CONCLUSION**

(1) The demographic profile of the student respondents revealed that the majority of the respondents are 21 years old, are females in terms of sex, are in grade 3 of their course.

(2) A student's good self-management skills in the context of self-directed learning empower them to take charge of their education, make thoughtful choices, and navigate the complexities of the learning process independently. This aptitude not only fosters academic success but also cultivates a mindset of lifelong learning and a capacity for continuous self-improvement.

- (3) A student with a good self-directed learning aptitude, particularly in terms of motivation, is characterized by intrinsic motivation, a proactive approach to learning, resilience in the face of challenges, and a strong sense of autonomy. These qualities collectively contribute to a dynamic and effective approach to independent learning, fostering not only academic success but also a lifelong love for learning and continuous personal development. A well-motivated self-directed learner is equipped with the mindset and skills necessary to navigate the complexities of education and thrive in various learning environments.
- (4) A student's self-directed learning aptitude in terms of self-monitoring encompasses metacognitive awareness, self-regulation, feedback-seeking behavior, and goal-setting skills. These components collectively contribute to a dynamic and adaptive learning approach. A student proficient in self-monitoring not only excels in content mastery but also cultivates a mindset of continuous improvement, critical reflection, and autonomy-qualities that are fundamental to successful self-directed learning in diverse educational settings.
- (5) The behavioral engagement of students with virtual reality technology is characterized by active exploration, participation in collaborative activities, adaptability to technological advancements, and resilience in the face of challenges. This engagement goes beyond mere consumption of virtual content and involves students actively contributing to and shaping their learning experiences within virtual environments. A high level of behavioral engagement in VR technology not only enhances individual learning outcomes but also contributes to the creation of a dynamic and interactive educational environment, where students actively and meaningfully engage with the content and each other.
- (6) A student's cognitive engagement in virtual reality technology encompasses sustained attention, critical thinking, hands-on interaction, spatial processing, and collaborative learning. This multifaceted engagement demonstrates the student's ability to adapt cognitive skills to the unique challenges presented by immersive and interactive virtual environments. Cognitive engagement in virtual reality goes beyond traditional learning methods, offering a dynamic and transformative educational experience that enhances students' mental involvement and understanding of complex concepts.
- (7) A student's emotional engagement with virtual reality technology is characterized by a sense of wonder, excitement, empowerment, social connection, novelty, and relevance. These positive emotional responses contribute to a more immersive, memorable, and impactful learning experience. The emotional engagement in virtual reality not only enhances the enjoyment of the educational journey but also plays a crucial role in fostering a positive attitude toward learning, ultimately contributing to the effectiveness of virtual reality as an innovative and engaging educational tool.
- (8) The factor age does affect the assessment of the student respondents on their self-directed learning aptitude in terms of self-management, motivation, and self-monitoring while the factors sex, and years of service does not.
- (9) The factor age, sex, and grade level do not affect the assessment of the student respondents on their engagement on virtual reality technology in terms of behavioral engagement, cognitive engagement, and emotional engagement.
- (10) The results suggest that certain aspects of self-directed learning aptitude, such as self-management, motivation, and self-monitoring, are associated with specific dimensions of engagement with virtual reality technology. While self-management is linked to behavioral engagement, motivation is closely aligned with cognitive engagement, and self-monitoring is associated with emotional engagement.

## 9. RECOMMENDATIONS

- (1) Given the positive correlation between self-management skills and behavioral engagement in virtual reality, educators and instructional designers should consider incorporating elements that promote self-management within VR learning environments. This might include features that encourage organization, time management, and goal-setting to enhance students' proactive behaviors in the virtual realm.
- (2) Recognizing the strong correlation between motivation and cognitive engagement in virtual reality, educators should implement motivational strategies to enhance students' overall engagement with VR content. This might involve incorporating gamification elements, setting challenging tasks, or providing personalized learning experiences to tap into students' intrinsic motivation and stimulate cognitive engagement.
- (3) The significant positive relationship between self-monitoring and emotional engagement in virtual reality highlights the importance of promoting self-awareness and reflective practices. Educators can integrate activities or features within VR experiences that encourage students to monitor their own progress, reflect on their learning journey, and provide opportunities for emotional connection and positive experiences.
- (4) Since there is a strong positive correlation between overall self-directed learning aptitude and overall engagement with virtual reality, it is recommended to adopt a holistic approach in designing VR experiences. Considerations should be given to incorporating elements that cater to various dimensions of engagement, addressing both behavioral, cognitive, and emotional aspects to create a comprehensive and effective learning environment.
- (5) To further refine the relationship between self-directed learning aptitude and virtual reality engagement, continuous assessment and feedback mechanisms should be implemented. Regularly collecting feedback from students on their experiences with VR technology and their self-directed learning practices can provide valuable insights for continuous improvement and refinement of virtual reality-enhanced educational content.
- (6) As virtual reality technology continues to evolve, it is essential to provide professional development opportunities for educators to enhance their skills in integrating VR into teaching practices. Educators should be equipped with the knowledge and skills to leverage virtual reality effectively, considering the identified correlations with self-directed learning aptitude.
- (7) To gain a more profound understanding of the long-term impact of self-directed learning aptitude on engagement with virtual reality, researchers are encouraged to conduct longitudinal studies. Tracking students over an extended period will allow for a more nuanced understanding of the evolving relationship between self-directed learning and virtual reality engagement.
- (8) Recognizing that students have diverse learning preferences, backgrounds, and interests, it is recommended to diversify virtual reality content and learning experiences. Providing a range of topics, scenarios, and interactive elements within VR can cater to different learning styles and ensure that virtual reality technology is accessible and engaging for a broad student population.

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