Exploring Motivation and Attitude Towards Science in the Online Distance Learning: A Literature Review

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Abstract— *This study determined the motivation and attitude of learners towards Science in the online distance learning in which findings served as basis for a proposed plan of action. The key themes presented in this work embodied all related foreign and local ideas, concepts, and principles to support the investigation. The results of this review would support school administrators and supervisors, teachers, students, parents, and researchers to aid in getting a better viewpoint of the subject under analysis and familiarizing knowledge that is applicable and comparable to the current research, allowing for a comprehensive and collective view of the learning environment. The literature review is arranged as follows. The study begins with online-distance learning environment followed by the student's motivation in learning Science, the students' motivation towards online-distance learning, Students' perceptions in online-distance education, the student's attitude in learning Science, and students' attitude in online-distance learning. Presented also is the related literature on K to 12 learners curriculum. The view concludes with a discussion about the motivation and attitude of students in the online-distance learning environment. Hence, this literature review sought to determine the utilization to determine the motivation and attitude of the students in the online-distance learning environment. Through this review of literature and studies, researchers will be able to make a view to making appropriate support on the present research and recommendations that could lead to improvement in the performance of students in their learning.*

Keywords— *Attitude towards science, motivation, online distance learning, college students.*

I. INTRODUCTION

It's been a significant focus of the research community on science education for the past 30–40 years to look at the attitudes and motivations of students to pursue science. Scientifically, focused, progressive, knowledgeable, flexible, forward-thinking, innovative, and contributing to science in online-distance in future discoveries are qualities that a rising country must cultivate. This study focuses on the motivation and attitude of students towards science in the online-distance learning environment. Its contemporary significance is underscored by rising evidence of a drop in young people's enthusiasm in pursuing a scientific career (Smithers, 2011). The study has shown that scientific literacy is an important outcome that can be transferred and that excellent character development results from science education as a nurture impact. Strategic strategies to assist students in becoming more competent and better citizens include scientific literacy and a solid character through teaching and learning procedures that include scientific literacy and character development. Science education is

crucial in this respect. The role of a science teacher in assisting these efforts is significant.

On the other hand, the teacher's problem is to find a way to get pupils excited about science and build a positive attitude and character. In science education, motivation and attitude have been acknowledged as significant concepts. The majority of the literature also indicates that motivation is a critical aspect of science learning. Science learning is effective because students are motivated to learn about science. Student motivation is vital in science learning because it promotes the 2 formation of a student's conceptual understanding of science. Several aspects will influence students' motivation to learn science (Canvas, 2011). According to scientists, policymakers, and educators, developing students' scientific literacy is an important goal of science education. A variety of definitions have been used to describe scientific literacy, with all of them emphasizing the ability of students to apply scientific knowledge in a variety of real-world settings (American Association for the Advancement of Science [AAAS], 1990, 2010; Bybee, 1993; Maienschein et al., 1998; Millar et al., 1998; DeBoer, 2000). Given the growing recognition of the importance, economic utility, cultural significance, and importance of scientific knowledge, the declining number of people choosing to study science has become a source of significant societal concern and debate when combined with research indicating widespread scientific ignorance in the general population.

Consequently, fostering attitudes and motivation toward science, scientists, and learning science, which has always been a component of science education, is becoming increasingly important. However, the concept of a scientific attitude and scientific motivation in an online-distance learning environment is somewhat ambiguous, sometimes poorly stated, and rarely understood. Several practical and political factors are driving the emergence of different forms of online programs. School districts, administrators, and lawmakers see the advantages of offering online classes. Since our educational climate has changed due to COVID-19, we must take the time to explore science education across the online-distance environment. Because of the sudden appearance of the coronavirus worldwide, schools jumped to online education. Still, we must understand that, just as one shoe size does not suit all, all 3 interactive frameworks for engaging students do not fit all. There hasn't been a lot of research done on successful instructional methods for online science education (Malaysian Journal, 2017). As a result, the researchers want to explore and determine the motivation and attitude of college students of

Cebu Roosevelt Memorial Colleges (CRMC) towards science in the online-distance learning environment.

II.   LITERATURE DISCUSSIONS

Online-Distance Learning Environment

The number of new virtual learning environments (VLEs) is increasing, and they are being touted as a solution for education that can be delivered from anywhere in the world. Several tasks can be completed by students using a computer-based learning environment. This is especially critical when the duties are difficult to perform in real life, such as when they are harmful. As a result, simulators exist. The term "virtual learning" can be used to describe e-learning. It is a software system designed to support teaching and learning, allowing tutors and students to interact in an integrated, online environment. It is used for online education via the World Wide Web.

This type of education is based on telemetric networks, with students typically connected to the Internet. In addition to the learner, there are various benefits to virtual education for all parties involved, including the course provider and the student's instructors. Initially, virtual education helps colleges reach out to students who would otherwise be unable to do so. There have been some categories depending on the amount of time in school. In some cases, e-learning is divided into two categories based on the timing of interaction, with computer-based e-learning and internet-based e-learning being the most common (Algahtani, 2011). For example, by engaging with rotating models through their avatars in SL, we investigated how students learned chemical topics (Merchant et al., 2012).

Students receive "just-in-time" guidance and quick feedback on their performance due to their interactions with the learning objects they use. In another situation, students were able to improve their ideas by strategically placing note cards in SL. The kids can also engage in informal interactions and learn from their surroundings. These features combine to make open-ended 13 virtual worlds a suitable environment for helping higher education learners (Megs et al., 2011). Furthermore, further research has looked into the function of virtual world selfefficacy in decision-making (Chow et al., 2012; Luse, Mennecke, & Triplett, 2013). Only a few staff members used the collaborative learning tools, and they were used primarily to keep track of work, assign assignments, and share sites with students. The use of hardware and software intermediaries is required to access such virtual learning environments. To detect the presence of others and communicate with them, the participant must have a means of detecting their presence. Strictly speaking, social and cultural conventions can only be reflected by an observable fact that can be explicit or symbolic (like in chat rooms). Because cyberspace is a different medium than physical space, it is also necessary to have rules that allow for manipulation and appropriation of information through the interface. These controls include social interaction guidelines for users, such as who can start a chat, join an existing conversation, mark up someone else's work, and so on (Read, Coles, Frey & Littlefield, 2013).

Students' Motivation in Learning Science

The majority of the research also points to the importance of motivation in science education. According to Cavas (2011), student motivation is vital in science learning since it helps students develop their conceptual grasp of Science. There is a strong correlation between students' attitudes and achievements in Science and their enthusiasm to learn about it in school. It's not uncommon to see the three components (behavioral factor (behavioral factor), cognitive, affective, biological event-personal element, and environmental factor) interact in the classroom. For example, when a teacher teaches a class, students may reflect 14 on what the teacher has stated (the environment influences cognition). Students raise their hands to ask questions to the teacher when they have difficulty or do not understand something in the course (cognition influences behavior). The point is repeated by the teacher (behavior influences). The teacher assigns exercises to the students at the end of the lesson (environment influences cognition which influences behavior). Students believe they are doing an excellent job on the assignment as they work on it (behavior influences cognition). Learning is influenced by motivation, which is a complex, multifaceted phenomenon that interacts with understanding (Taasoobshirazi & Sinatra, 2011). Attitude matters the most that's why it is necessary for learning. A person who is enthusiastic about science or some other topic that will stimulate students to concentrate on it, be motivated and interested. Learner's optimistic attitude towards science is a crucial field of educational research for some reasons, including the impact it can have on people's attitudes toward science and potential career choices (Tinapay et al, 2021).

Students' Motivation towards Online-Distance Learning

Students motivated to learn Science are more likely to develop a conceptual grasp of Science. According to studies conducted, students' motivation levels have a significant effect on their science attitudes and performance. In the literature, various factors have been identified as boosting students' desire to learn Science. The motivation and attitude approach to student motivation currently used in science education cannot be considered separately. As a result, all elements that influence motivation may imply an educational environment for science education (Cavas, 2011). According to the research, a significant aspect of science learning is motivation. Given the complexity of the linkages between students' motivation and the application of learning strategies, this scenario cannot be resolved. Researchers in mathematics and science education must make an effort to find ways to make mathematics and science education less dry and more appealing (Berger &Karabenick, 2011 However, there is a lack of appropriate evidence-based research in this area (Kimmons, Liu, Kang, and Santana, 2012). It is commonly assumed that new technologies will alter the way people 15 learn. According to several proponents, people who believe in e-learning should have a fundamental understanding of technology and be able to use it to achieve educational goals (E-learning, 2013). As a result, e-learning has become a significant part of many colleges' curricula.

The need for intellectual and technological knowledge to teach using the Internet has emerged, and many instructors consider this knowledge a critical competency. According to some academics, the typical classroom may vanish shortly. Traditional delivery methods have been replaced by e-learning, which has permeated both the educational and corporate worlds in significant ways. Traditional educational traditions, such as distance learning, have been made possible (Haverila & Barkhi, 2009; Tamrakar & K. Mehta, 2011). When it comes to higher education, e-learning has traditionally been used to (1) increase the visibility of the institution, (2) expand the educational suggestion, and (3) as "virtualization" of learning, which has three purposes. When it comes to e-learning, the importance of organizational preparation variables has been discovered to have a substantial impact. In E-Learning, the motivation and education of teachers are also important (Keramati, Afshari-Mofrad, &Kamrani, 2011). The majority of medical students were optimistic about the learning experience when it came to using e-learning to improve their understanding (O'Neill et al., 2011).

This study discovered that student motivation during self-directed e-learning (SDEL) was the best predictor of positive change in motivation and that learner agreement with SDEL was the best predictor of positive change in motivation, according to the findings (Kim & W. Frick, 2011). For e-learning to succeed in developing countries, technology understanding, motivation, and changing learners' behavior are all critical success factors, emphasizing the 16 importance of content preparation for learning success. As a result of the Personalized Learning Course Planner with E-learning system, student happiness and learning efficiency have increased. Suggesting a learning course appropriate for students' previous test scores and priorities encouraged them to focus on the lesson, supported by subsequent examination of the participants (Jeong, Choi & Song, 2012). Their study shows that students who take a more in-depth approach to learning (i.e., intrinsic motivation and deep learning strategies) prefer to learn at a higher level of quality. The quality of the learning product improves as motivation is interfered with. Furthermore, extrinsic and intrinsic motivation significantly affect students' academic achievement (Isa Figueira & Manuel Duartes, 2011).

Students' Perceptions in Online-Distance Learning

The features of students, identified as crucial factors in online learning in developing countries in several research studies, had a significant impact on online understanding and acceptance (Bhuasiri, 2012). The critical thing to remember here is that schools are not required to deploy online classes but rather that they are viewed as a modern tool for resolving challenges that arise during the learning process (Agustina and Cahyono, 2017). The social aspects of online courses harm students who attend traditional schools. Still, online students have had positive experiences, although online courses haven't constantly encountered their outlooks in terms of knowledge. Both students see online education as suitable but not always encouraging their knowledge objectives.

The most beneficial component of an online class is the students, while other participants, such as teachers, have conflicting opinions about it. The key objective is to establish the roles of the students by observing their interactions with the professors (Armstrong, 2011). 17 Students decided to take online courses over face-to-face classes in research comparing the two because they wanted to avoid the hassle of having to travel to class and schedule conflicts (Horspool and Lange, 2012). In asynchronous instruction, teachers and students do not meet synchronously, and students can access course materials via the Internet at any time they want or need. In most cases, the instructor is in charge of controlled communication between the participants via email and online forums (Watts, 2016).

A survey on the differences between online and traditional course formats revealed that most of the reasons why students choose to take online courses include the option to fulfill work and family timetables, the desire to prevent driving to the university, or the availability of more online courses (Dobbs et al., 2017). Furthermore, if the system were presented on a simple platform, they would be more motivated to take the course (Aharony & Bar-Ilan, 2016). As a result, teachers' roles have altered to assist students in developing skills and tools for critically analyzing the vast amount of information available from many sources. Modern education and teaching emphasizes more in-depth, student-centered learning methodologies that evaluate, develop, create, and demonstrate comprehension. It does not only emphasize the transmission of information, ability, or application related to a specific topic (Tinapay & Tirol, 2021)

Students' Attitude in Learning Science

College students' learning, such as knowledge, application, and problem-solving, are typically measured via tests, which science teachers frequently characterize. Many instructors analyze how students' attitudes influence their learning; according to a superficial examination of teaching and learning research papers, students' tendency to understand science is determined by their positive or negative feelings. Educators in science use a combination of attitude and learning measures to help them decide whether or not their instructional interventions are effective. Compared to measuring learning, evaluating students' attitudes poses similar but separate issues, such as determining the validity and reliability of instruments and selecting appropriate statistical analysis methods. These techniques, as student interviews, provide rich data that can reveal new insights and 18 allow students' ideas to be flexible and clarified (Slater et al., 2011). Middle school is one of the most fundamental levels of education in Rhode Island, according to RI Law No. 20 of 2003. Every occurrence in nature is explained by natural science, a set of related subjects (Doyan, Taufik & Anjani, 2018). Specialists in secondary schools help students facilitate professional learning (Pringle, Mesa & Hayes, 2017). Students' attitudes can significantly impact their academic success and performance (Liaghatdar, Soltani & Abedi, 2011). By discovering existing notions, the scientific perspective in science was introduced early. It is common for parents to communicate complex scientific concepts by relating them to familiar situations (although erroneously) (Alexander, Johnson & Kelley, 2012).

What people think about science is what they think about it. Perception or misperception about science mediates the relationship between perceptions and awareness (scientific knowledge, perceptions, and attitudes) (Lee, 2018). Student attitudes toward science are influenced by many factors, including their scientific mindset. Inseparable from one another science-related and scientific-related attitudes. A student's potential to learn scientific information about science in life can be realized through synergy from the development of scientific attitudes. Therefore, a critical examination of the level of scientific perspectives and teachers' attitude toward teaching science is required for teachers to develop each student's scientific skills (Erdogan, 2017: Lacap, 2015). Learning enjoyment is a student's expression of feeling linked to their desire to study and their school performance and academic achievement in the classroom (Manasia, 2015). Everyone with a positive attitude toward science should feel completely comfortable and like the process of learning it when they do it. In this way, student satisfaction with the 19 science learning process could be measured by the way students respond to it in general, as well as how they express their satisfaction with the having to learn the procedure in general, as well as how they express their satisfaction with the science learning process involved, as well as how they express their satisfaction with the science learning process (Maharaj-Sharma & Sharma, 2017). Student satisfaction with science is determined by their happiness or liking attitude, but dissatisfaction with science is determined by their dissatisfaction with science. Students appreciate science because they are excited about it both inside and outside of the classroom, demonstrating their genuine interest in learning and doing. Career decisionmaking abilities are vital for all students since they must mature in their choices (Zamroni, 2016).

Any potential student interested in pursuing a profession or furthering his studies in science can be regarded as having a career interest in the area. For every state, fostering a child's interest in science and related vocations is a critical duty since parents' favorable attitudes and values about the subject of science motivate parents to encourage their children to pursue careers in science (Halim et al., 2017). Rohmawati, (2012), It is increasingly critical to encourage students to choose a profession in science or to continue their studies. Natural sciences are very significant in everyday life to meet human requirements in solving difficulties, and the use of science is done carefully to ensure environmental sustainability. Despite the undeniable relevance of science in our lives, studies reveal that many people have negative attitudes toward science. Regardless of the absolute importance of science in our lives, research shows that many individuals have negative attitudes toward science. In addition, having a positive attitude toward science can improve student performance across the board and encourage them to 20 think critically about scientific and non-scientific issues that arise throughout their lives. The design of our courses, particularly the type of delivery model we use, becomes more critical due to the positive attitude toward science that students have toward the discipline (Rohmawati, 2012).

According to research, students' traits, which were seen as crucial criteria in online learning in developing countries, significantly impacted online understanding and acceptance (Bhuasiri et al. 2012). On the other hand, the quality and ease of using online learning courses and the students' level and computer skills all impact their attitudes (Aixia, 2011). Their computer experiences, which include apparent self-usage, satisfaction, and efficacy, and the utilization of online learning, have a significant role (Liaw, 2011). According to a thorough analysis of the research, students' interest in online education, computer usability, and convenience of use are linked in a significant and favorable way. According to several studies, kids who were forced to stare at a computer screen felt isolated and lonely. There is a positive relationship between student attitudes and responses, which educators have long known.

According to Burns ' research, evaluated beliefs that predispose an individual to respond preferentially are attitudes. Teachers have thus been charged with the constantly changing responsibility of enhancing the content of the curriculum and its delivery and resources to encourage good learning attitudes to boost student performance. Furthermore, engagement with their teachers and peers was valued and benefited them much. This course's key answer was engaged with professors and classmates when asked, "How could this course better support your learning?" It suggests that self-discipline and drive have a part in students' views about distant education as we 21 continue to investigate internal elements that influence them. Keeping focused when completing online projects may be difficult for a student who lacks desire. In addition, students' experience with technology is another aspect that can influence their satisfaction with their online courses. Students' happiness with online classes might also be affected by their previous experience with technology. Uncertainty can be exacerbated by a lack of expertise combined with technology concerns. They also noted that the risk of technological problems and inexperience with technology could make long assignments appear much longer and contribute to students' discontent with the amount of time required to finish online homework. Future selections concerning educational or training opportunities for students will likely be influenced by their experience with an online learning unit in a blended setting.

According to the data, students who have had greater exposure to technology and e-learning are more likely to be optimistic about it, which could indicate that. According to the findings, students found course content sent to their mobile devices to be stimulating and enjoyable. Students' desire to engage in individualized learning, according to the authors, indicates their want to do so. It is critical to consider students' preferences and use practical solutions to satisfy these needs to ensure continuity. The impact of external factors on attitudes toward online learning (Lee, Srinivasan, Trail, Lewis) must also be investigated. As a result of this study, it is also important to underline the importance of these external factors in understanding student attitudes about remote education. Several studies have revealed that many external influences can influence student perceptions. Various external factors can also affect student attitudes, including their perceptions of support. The degree of satisfaction with the course was linked to the

students' perception of support. 22 Whenever one of the above-mentioned technological issues or assignment ambiguity arises, it is critical for students to feel comfortable contacting their instructor or a member of the Information Technology (IT) department (Leeetal, 2011).

Students' Attitude in Online-Distance Learning

In recent decades, the rise of distance education at campus-based colleges has made it more vital for universities to manage the transition from face-to-face to remote education. Learners' attitudes toward online learning and distance education are one aspect that influences this change. In recent years, the usage of distance learning has grown significantly. It indicates that self-discipline and drive have a role in influencing students' views toward remote education. Even though changing teaching practices might be challenging, there is evidence that instructors rely on student needs more than empirical findings (Price & Kirkwood 2013).

Keeping focused when completing online projects may be difficult for a student who lacks desire. Students were progressively being offered online opportunities for education, whether through modified teaching approaches or increased use of technology even in conventional classrooms. As a result, there is a need to describe the specific challenges that students face while taking online courses, as well as to identify pedagogical methods that can resolve and improve the chances of good online teaching and learning (Diu et al, 2022).

K-12 Curriculum in Science

Students are taught to be scientifically literate, preparing them to be informed and active citizens capable of making judgments about how to apply scientific information in ways that have social, health, and environmental implications. The importance of science and technology in everyday life is recognized in the science curriculum. It integrates science and technology into all elements of life, including social, economic, personal, and ethical considerations. Science education highlights the importance of scientific and technological capability in maintaining our country's cultural identity. In terms of developing scientifically, technologically, and environmentally literate and influential members of the community, the K–12 science curriculum is learner-centered and inquiry-based, with a focus on using evidence to construct explanations, and it emphasizes critical thinking skills, responsible environmental stewards, innovative and creative citizens, and informed decision-makers. To prepare students for a deeper grasp of basic concepts in life and the sciences of science, physics, chemistry, and earth science, concepts and skills are presented with growing difficulty from one age level to another in a spiral development (Tirol, 2021).

As students go to the next grade level, the curriculum was introduced. The spiral progression method, which strives to enhance Science and Math instruction, is one of the frameworks of the K-12Enhanced Basic Education Program. The improved basic education curriculum shall be governed by the spiral progression method throughout courses, as mandated by RA10533 and supported by DepEd Order 31 s. 2012. It is organized in such a way that it builds on the same principles in each school level, rising in complexity from Kindergarten to Grade 10. It is given that teachers should also adapt to the new, approach (Comediero et al 2022).

III. CONCLUSION

With virtual learning, resource allocation might be made significantly more efficient. The virtual laboratory saves time for students and staff and lowers the cost of hardware. Creating a blended learning environment (VLE) in which all course components are managed using a consistent and standardized interface across the institution is an emerging trend in higher education. Learning and creativity skills are vital in this new social era. Learners are prepared for their future occupations by using this learning by doing method. Concerns about unreliable technology and a lack of support for teachers and students appear to be significant roadblocks to VLE adoption. As the number of teachers who use virtual learning environments (VLEs) expands, more standardized training and support mechanisms are required. Even though many students and teachers remain skeptical about the advantages and disadvantages of virtual learning environments (VLEs), both student survey responses and teacher focus groups show that increased exposure to e learning and virtual learning environments (VLEs) increases both student and teacher comfort with these tools, which in turn increases motivation to use them more deeply (Sun & Kang, 2015).

IV. PROPOSED PLAN OF ACTION

Developing Motivation and Right Attitude Towards Science Rationale

In this section, a proposed plan of action consisting of the developmental program to improve the motivation and attitude of students towards science is presented. Inflexible learning, the school should provide an excellent online environment that models better science instruction and regulate its activities. In particular, because a large majority of the respondents have little agreement towards their science motivation in both intrinsic and extrinsic aspects; thus, the school must implement a developmental program for the teachers to enhance online instruction.

The administration could look into evaluating the current learning activities of the students and create a panel that would ensure its quality as regards the simplification of learning activities in science online. Activities specifically directed to curtail and meet the competencies required by the CHED during online classes through web-based learning could be proposed, if not enhanced, and actively and adequately implemented. The focus of this plan is to improve students' motivation and attitude towards science. To achieve this, the first objective is to enhance the lessons online through developing LAS. A need to conduct an intensive review of the students' modules had surfaced from the said objective, which involves the department heads, teachers, and academic coordinators. This enhancement of LAS that simplifies the activities without compromising the students' competencies will set a standard for the activities to provide to the students and ease the burden of teachers as well.

In addition, it would be necessary to evaluate the effectiveness 49 of the current modules and the online learning

platform used by the teachers to identify the current strength of the modules and its areas needing improvement.

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