MOTIVATIONAL APPROACHES AND STUDENTS' ABILITY TO ABSORB BASIC SCIENCE SUBJECT

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ABSTRACT

Science subjects are the bed-rock upon which the science and technological advancement of any nation is built. ***The first form of subject that prepares students in the upper basin towards science subjects such as Physics, chemistry, biology and geography is Basic science; it enable students to be well grounded for their further sciences courses in their education endavour. Thus, the*** *teacher's role in motivating and sustaining students' interest in learning Basic science is crucial.* ***This is why this*** *review paper examines the complex interplay of student motivation in learning the subject in junior secondary school, honoring its multi-dimensional character. It explores the influence of the five key motivational theories viz: Attribution, Goal Orientation, Self-Efficacy, Two-Factor, and Equity. The main goal is to equip teachers with concrete steps to foster passion for scientific investigation and improve student learnng experiences; through a comprehensive search of relevant literatures from major research platforms: google scholar, research gate, Pubweb and ProQuest. The study uncovered how educators can strategically utilize these models in their classrooms to enhance students' engagement with scientific concepts. By investigating the specific strengths and weaknesses of each theory, the further paper seeks to identify effective and actionable strategies for cultivating student motivation in elementary science education. Intrinsic interest can be fostered with experiment-based activities, genuine problem-solving, and student-inquiry. The growth mindset can also be cultivated by acknowledging effort, reframing mistakes as learning opportunities, and encouraging resilience. Encouraging self-efficacy involves presenting the right balance of challenging tasks, breaking tough concepts into easy ones, and delivering constructive feedback that emphasizes improvement. Finally, an equitable and fair learning environment is creating an environment where all feel valued, respected, and have an equal opportunity to develop and flourish.*

Keywords: Basic science, Teacher, Motivational, theories, Approaches, Students

INTRODUCTION

Education is a essential ingredient in any society. Education is adopted as an instrument for effective national development and growth so as to produce citizens that are dynamic both in thought and deeds, self-sufficient, effective, united and show civil responsibility (Federal Government of Nigeria, 2004). The increasing awareness of the importance of education to the up-liftment of the individual and societal standards has awakened in people and nations a conscious effort at devoting their meager resources to acquiring qualitative education (Ekundayo, 2008). Educational administrators and managers are interested in the optimization of every sphere of education for efficient co-ordination and management. The Impact of Science teachers' motivation on science students' academic performance in Public Schools in Nigeria is one of the grey areas of education that deserves the attention of all stake holders in education (Haydée De Loof et al., 2021)

Development of any nation is a measure of her development in the area of Science and Technology. This implies that countries with strongly supported science programs are better off economically have greater numbers of people creating new technologies. For example America, Russia, Japan and China are typical examples of developed nations as a result of their stability in the area of Science and Technology. In fact it is not surprising that Harris, (2011) reveals that "technological and scientific revolution is one of the defining features of modern human history". This author further lamented that acquaintance with science and technology as elements of human culture should be the major goal of every individual, independent of his or her occupational needs. This is one of the reasons that today science and technology are giving significant consideration in both primary and secondary education in order to lay a sound foundation to the young generation (Gavin et al., 2020)

Science Subjects are the bed-rock upon which the Science and technological advancement of any nation is built. Science is the theory upon which the technology is built, without Science; there cannot be intuition for technology (Ogungbemi, 2005). Nigeria as a nation needs tremendous improvement in the area of Science and Technology. Science teachers are very important in turning out highly needed and skilled manpower which form the bed-rock of national development. This implies that the technological development of the nation depends on the quality of Science education obtained from schools and Science classrooms (Konmm Owuazor, 1993). But unfortunately, reports from WAEC Chief Examiners (1998-2007) have revealed that many students do perform poorly every year in their final examination result and many students show lack of interest in science subjects. However, the student poor performance could be originated right from the junior secondary schools level based on the belief that science subjects are complex and difficult to comprehend. This may be as a result of nature of our teachers' strategies and method of imparting the knowledge during teaching-learning process coupled with lack of resource materials that will facilitate and ease the learning process.

Subsequently, the teacher's role in motivating and sustaining students' interest in learning Basic Science is crucial. The teacher must device his/her own styles/strategies to motivate the students to learn in order to achieved the desired goal of teaching the subject. On the other hand, academic achievement of students at secondary school level is not only a pointer of the effectiveness of schools but also a major determinant of the well-being of youth in particular and the nation in general (Lewin, Wasanga, Wandari and Some set, 2011). According to Adediwura

and Tayo (2007) academic achievement is determined by test and examination scores or marks assigned by the teachers. Yusuf and Adigun (2010); Lydia and Masango (2009) noted that the performance of a student in any academic task has always been of special interest to the government, parent and society at large, and this account for the reasons why scholars have been working hard to investigate factors that militate against good academic performance. Adu and Olatun, (2007) reported that teachers characteristics are the predominant determinants of students performance in secondary schools. Heck, (2009) also agreed that, teachers cannot be disassociated from the schools they teach and the academic result of their students.

Indeed, the importance of study about teachers' variables like motivational and instructional techniques cannot be over emphasized. Teachers have a lot of influence on their classroom activities towards attaining educational objectives, for student to make connection between what is taught in school and its application in solving real life problem, teachers have to be effective in their teaching (Bandura, 1997). Adeyebe (1993), Adeniji (1998) & Nwafor (2012) opined that the student's performance in Basic Science subject in Junior Secondary School Examinations in Nigeria has not been encouraging. It has been observed in the literature that students' poor performances in basic science emanate from both students and teachers factors. It is therefore becomes necessary that emphasis should be geared towards motivating students interest in Basic Science subject. The role of the teacher is paramount and influential, in motivating students' interest in Basic Science subject. The students should be guided by their teachers in their quest for knowledge, and be actively involved in the classroom exercises. There should be a proper interaction between the teacher and the students in science so that interest can be developed and sustained.

Acceptably, teachers perform numerous tasks which include preparing and delivering lessons, managing the classroom and enhancing students motivation for achievement, but one of the best attribute of effective teacher is a strong sense of efficacy (Tanya, 2002). Self-efficacy believe of a teacher is the judgment that his ability would be effective for achievement of the student especially the ones who have difficulty with motivation. Jackson, (2010) reported that, "a teachers must have good understanding of various motivational dimensions in order to tap into the greatness of the study's and help the students become best of themselves" research evidences, for instance Tchannen-Moren and Hoy, (2001) have shown that if students are motivated, they will likely be more curious to move towards positive academic achievement.

Therefore, the need to give a sound grounded knowledge in Basic Science to junior secondary school student cannot unconnected to maintain and sustain students' interest in the subject through adoption of effective motivational strategies/styles. Hence, this study attempts to determine the influence of teachers' motivational strategies/styles on the academic achievement of students in basic science in Bauchi Metropolis.

REVIEW OF LITERATURE

TEACHING AND LEARNING OF BASIC SCIENCE SUBJECT IN NIGERIA

Basic science formerly known as Integrated Science is the first form of science a child comes across at the secondary school level. Basic science is a core subject in the National curriculum at the upper basic level (Kim, 2008). All students from upper basic I-III classes must offer and study the subject. Basic science is considered the bedrock of all science subjects at the senior

secondary school (SSS) level. The subject prepares students at the upper basic level for the study of core science subjects (biology, chemistry and physics) at the senior secondary school level (Olarewaju in Oludipe (2012). That is why Oludipe (2012) further emphasized that for a student to be able to study single science subjects at the senior secondary level successfully; such a student has to be well grounded in Basic Science at the upper basic level. Based on this, it is generally taught as a single science subject, until in the SSS level, and then split into specialized science subjects (biology, chemistry and physics). It is expected that those students who achieve well in basic science should be given the opportunity to study the separate science subjects at the SSS level. According to Trustees of Princeton University (2013), Basic Science is a revolutionary new introductory science curriculum developed at Princeton intended for students considering a career in science. Basic science emphasizes scientific literacy and research-oriented learning (Eyles, 2009). The subject encourages exploration of student's immediate environment. As a result, basic science teachers continue to learn along with their students. The teaching of basic science is therefore, based on the philosophy of active learner-participation in the process whereby, students are encouraged to learn by constructing their own knowledge based on what they already understand as they make connections between new information and old information, guided or facilitated by the teacher (Piaget, 1956). Under this philosophy, students are encouraged and led to discover concepts and generalizations based on their experiments.

Akinmade (1996) in his research rightly pointed out that, when children learn science using the process and activity approaches, they improve their ability to apply intellectual skills to solve problems, improve their language development, become more creative, master science content better and develop positive attitude towards science and scientists. Research by Bello (2007) has shown that the above desires are not being achieved as expected. The learning environment is expected to be democratic, the activities are interactive and student-centred and the teacher facilitates the process of learning in which students are encouraged to be responsible and autonomous.

The importance of basic science in everyday life can never be over emphasized. It serves as the bedrock which provides the required training in scientific skills to meet the growing needs of the society. It is the fundamental knowledge acquired through basic science at the upper basic level that leads to the transformation of the world through dramatic advances in almost all fields including medicine, engineering, electronics and aeronautics among others (Guyana Chronicles online, 2009). The application of scientific knowledge acquired through basic science, as reported by Guyana Chronicles (2009) that helped many countries like China and India to transform from poor feudal type economies to become economic and industrial power houses and in several ways compete effectively with developed countries. Basic science is of great importance because early experiences in science help students to develop problem-solving skills that empower students to participate in an increasingly scientific and technological world (Guyana Chronicle, 2009). Basic science is the type of science which provides unique training of students in observation, reasoning and experiment in the different branches of science; it also helps students to develop a logical mind (Prakash, 2012). Basic science enables students to be systematic and enables them to form an objective judgement. Basic science, if taught according to its philosophy, equips students with the necessary introductory scientific and technological

knowledge and skills necessary to build a progressive society. This forms the bedrock on which scientific and technological studies rest, Adejo and Idachaba in (Ochu & Haruna, 2014).

FACTORS AFFECTING STUDENTS ACADEMIC PERFORMANCE IN BASIC SCIENCE SUBJECT

It has been shown that teachers have an important influence on students' academic achievement. They play a crucial role in educational attainment because the teacher is ultimately responsible for translating policy into action and principles based on practice during interaction with the students (Afe, 2001). In their study, Wright, Horn and Sanders, (1997) concluded that the most important factor influencing student learning is the teacher. Teachers stand in the interface of the transmission of knowledge, values and skills in the learning process. If the teacher is ineffective, students under the teacher's tutelage will achieve inadequate progress academically. This is regardless of how similar or different the students are in terms of individual potential in academic achievement. According to Rivkin, Hanusheck and Kain, (2005), there has never been consensus on the specific teacher factors that influence students' academic achievement. Yala and Wanjohi, (2011) and Adeyemi, (2010) found that teachers' experience and educational qualifications were the prime predictors of students' academic achievement. However, Ravkin *et al*(2005) found that teachers' teaching experience and educational qualifications were not significantly related to students' achievement. Oredein and Oloyede, (2007) opined that teacher management of homework and assignments given to students have an impact on student achievement especially when it is well explained, motivated, corrected and reviewed during class time and used as an occasion for feedback to students. Engle and Theokas, (2010), concluded that several factors can influence students academic performance, the factors include class size, learning materials, teacher-efficacy about his belief of the right classroom management and control, application of the appropriate instructional strategies, and ability to make judicious use of the resources. However, the researcher reviewed some detail factors that affect students' academic performance by both teachers and students:

TEACHERS' QUALITY AND PROFESSIONAL

Poor quality of science teachers in terms of adequate knowledge base and pedagogic skills is another factor identified to influence students' performance. The teacher's academic qualifications and knowledge of subject matter, competencies and skills, and the commitment of teacher have a great impact on the teaching learning process. A science teacher is anyone who teaches science. Science teachers in Nigeria are prepared mainly at colleges of Education and faculties of Education of different universities. Achieving the goals of science education requires qualified and highly scientifically literate teachers. Okureme (2003) posited that: An effective science teacher should be a master of his subject, as well as grounded in methods of teaching and be able to relate the science concepts to real life experience. Abd–El-phallic and Boulaoude (1997) conceived such teachers as those who understand the concepts, principles, theories and processes of science and are aware of the complex relationship between science, technology and society. Such teachers more importantly must develop an understanding of the Nature of Science. This is important because the portion of scientific knowledge science teachers choose to teach and how they carry out the instruction presents a particular view of the nature of science to their students. (Omoifo, 2012). The teacher knowledge base for effective science teaching is very

important in that they are to help the students completely understand the content and underlying philosophy of science. This has long been stressed and culminated in recent emphasis on teacher preparation programmes that will produce sound and effective scientifically literate teachers. Different studies showed that the most important resource input in the school that predicts student achievement is Teacher Quality and effective teacher will have students with good test score (Dahar, Dahar, Dahar and Faize, 2011). The five indicators of teacher quality according to Dahar et al (2011) are academic qualification, professional qualification, in-service refresher courses and training, teacher experience and teacher salary.

TEACHERS SALARY

Teacher salary is very important as a predictor of students' achievement because it has a capacity to uplift the other aspects of teacher quality. If a teacher gets a suitable salary that covers the basic living costs, he may be able to live comfortably and thus be more effective as he is motivated to use his abilities, competencies and skills. Poor remuneration affects the morale of teachers, distracts and hinders their commitment and effectiveness.

QUALITY INSTRUCTIONAL RESOURCE

Lack of ideal resources for science teaching and learning in Nigerian schools has been a major issue of concern. It is a well-known fact that the quality of education a student receives largely depends on the quality of teaching/learning resources provided. Teaching learning resources are all the things used by the teacher during teaching to aid understanding and make teaching successful and effective. They include modern textbooks, equipment, consumables like chemicals and reagents, models, charts e.t.c. and the physical learning environments which include the science classrooms and laboratories. One of the major objectives of science education is to teach students the scientific process. Students need some investigative skills such as observing, measuring, classifying recording experimenting, analyzing inferring, e.t.c. To achieve this, science classrooms, laboratories and the general learning environment must be adequate and conducive. Inquiry focused science teaching demands a lot of activities on the part of the learner that require scientific materials and equipment. Due to the fact that majority of schools lack the essential resources for imparting the knowledge of science concepts to students, many students learn little science, learning tends to be by rote and many students find science not interesting and boring (Ogunmade, 2006). The teacher student interactions in many science classrooms are not healthy because of lack of adequate resources. In most of our schools, there are no facilities for the teachers to demonstrate phenomena, let alone allow the students to have opportunities for finding out things for themselves (Audu and Oghogho, 2006). The situation in many science classrooms in Nigeria is nothing to write home about. In many schools there are no laboratories. Some schools merely have empty rooms labeled laboratories. Students rarely have hands-on, minds-on experiences. Few days to science practical examinations, most schools acquire science equipment for teacher demonstration to students. This cannot make for effective learning and eventually results in poor achievement (Omoifo, 2012). To worsen the problem of lack of or inadequate resources, the few available ones are not properly maintained, protected and cared for. Ogunmade (2006) stated that "Majority of students do not have textbooks and most of the schools do not have libraries and where they have one, the textbooks in the libraries are outdated.

TEACHERS' USE OF EFFECTIVE INSTRUCTIONAL METHODS

A teaching method comprises the principles and methods used for instruction. Commonly used teaching methods include class participation, demonstration & recitation. The choice of teaching method used depends largely on the information or skill being taught in addition to the aptitude and enthusiasm of the learner.

Many students develop a negative attitude towards a given subject not because of its content but due to the inadequacy of how it is taught. Teachers have a challenge to motivate learning by presenting subject matter in a way students can understand and appreciate.

STUDENTS' INTEREST (RELEVANCE)

In the case of relevance, it has been commonly equated with students' interest in a task that they do (Hanrahan, 1998; Matthews, 2004; Osborne & Collins, 2001). Levitt (2001) interpreted relevance as importance, usefulness, or meaningfulness to the needs of the students. Keller (1983) defined relevance as a more personal interpretation, i.e., a student's perception of whether the content or instruction satisfied his/her personal needs, personal goals, and/or career goals. When students themselves decide on the topics of interest in school science, relevance takes on a personal meaning when students' hearts and minds are captured (Gardner, 1985; Osborne & Collins, 2001; Reiss, 2000).

STUDENTS' SELF-DETERMINATION IN LEARNING

is the ability of students to choose and control over what and how they want to learn (Reeve, Hamm, & Nix, 2003). An advantage of this approach is that when students are given the freedom to determine their academic tasks, they are more likely to benefit from them (Glynn & Koballa, 2006). Garcia and Pintrich (1996) found that the intrinsic motivation of college biology students increased when the students could select the course readings and term paper topics as well as the due dates for class assignments. Reeve et al. (2003) also concluded that when students believe that they have some degree of control over their learning, such as selecting some of their lab topics, overall motivation is increased. In a study conducted by Black and Deci (2000), results obtained supported the idea that self-determination leads to improvements in student learning. They found that students with a high desire to enroll in the course were significantly correlated with perceived competence, interest/enjoyment of the course, low anxiety, and were more focused on learning whilst those who enrolled due to course requirements were significantly correlated with dropping out of the course. Lavigne, Vallerand, and Miquelon (2007) posited that teachers who support self-determination in students' result in a positive impact on students learning toward science and pursuing a career in science.

Notwithstanding, the researcher explored additional teachers' motivational strategies that affects learning in the classroom which includes: *Jokes, short stories and questioning* such that student's attention is assured; *Classroom discussion* which aimed at involving the student actively in the teaching and learning science; *Field trips* to show students things in their natural environment; *Projects* to enable student do it themselves and carryout activities independently or by consulting peers, parents, persons or even literature; *Inquiry* to help student discover and see relationship in what they discover and organize their new discoveries into meaningful ideas; *Cooperative learning* to enable the students cooperate with each other to perform or complete a particular

task. Teacher should also *assign roles* to students in Basic Science classroom to help them develop social skills and improve communication skills.

METHOD

This paper takes a qualitative narrative approach to synthesize how motivational theories affect students' learning of Basic Science at the junior secondary school level. The method offers room for the inclusion of broad theoretical and empirical literature, particularly those related to classroom motivation and science education. Relevant data were gathered from secondary sources such as journal articles, academic books, and theses published from 1990 to 2025. Google Scholar, ResearchGate, Pubweb, ERIC, and JSTOR databases were used in searching for studies on motivational strategies in science education, specifically in the Nigerian context and other developing nations. Studies were included if they addressed student motivation in Basic Science and employed one or more of the theories of Attribution, Goal Orientation, Self-Efficacy, Two-Factor, and Equity. Only empirically based, English language published research was included. Non-empirical opinions and methodologically unclear research were not included. Data that were pulled out were thematically synthesized by author, publication year, motivation theory, and primary findings. This helped to identify commonalities and applications across studies. While the review doesn't report statistical analysis, it provides a comprehensive synthesis of the impact of motivation on student performance. The review's limitations are potential for publication bias and quantitative generalizability.

THEORETICAL FRAMEWORK

THEORY OF MOTIVATION

Educational psychology offers a range of powerful motivational theories, each explaining different aspects of how students learn. Think of them as Attribution Theory, Goal Orientation Theory, Self-efficacy Theory, Two-Factor Theory, and Equity Theory. When teaching basic science, these theories act like special lenses, helping us understand why students see success the way they do, form goals, develop confidence, respond to the classroom, and whether they feel things are fair. By using these lenses, teachers and researchers can create even better, and more motivating, ways to teach science fundamentals

Attribution Theory: The author of this theory is Bernard weiner. Attribution theory is the most influential theory with implications on academic motivation. It incorporates behavior modification in sense that it emphasizes that learners are motivated by the pleasant outcome of being able to feel good about themselves. An important assumption of attribution theory is that people will interpret their environment in such a way as to maintain a positive self image that is they will attribute their success or failure to factors that will make them feel good about themselves. In general this means that when learners succeed at an academic task they are likely to attribute their success to their own abilities but when they fail, they will link their failure to factors which they have no control such as bad teaching or bad luck. The basic principle of attribution theory as it applies to motivation is that a person's own perceptions or attributions for success or failure determines the amount of effort the person will expend on the activity in future (Honghui Zo, 2023)

Goal orientation theory: The author of this theory is J. A. Eison an educational psychologist. Goal orientation theory is a social cognitive theory of academic motivation. Although it has its origins in the nineteenth century. It became a major theoretical framework in the study of academic motivation after 1985. Unlike the other theories of motivation that deal with students' beliefs about their success or failures, goal orientation theory examines why students engage in their academic work. According to this theory, goals fall into two categories and their conceptualization is important (Pintrich 2000). The first type are the masterly goals that are possessed by students who strive to understand or master the task at hand. Such students are interested in self-improvement and tend to compare their present achievement to their prior achievement. The second type are the performance goals in which students have the drive to demonstrate their ability compared to others. Such students are interested in competition, demonstrating their competence and outperforming others; they tend to use other students as points of comparison rather than themselves. This theory is relevant to the study as students have to be self-motivated before they can be motivated by others. Competition is one of the motivational techniques to be surveyed falls into the second category of goals found among students.

Self efficacy Theory: This author of this theory is Albert Bandura a psychologist who specializes in personality psychology and social cognitive therapy. Self-efficacy is the extent or strength of one's own beliefs in their abilities to complete tasks or accomplish goals. Self-efficacy provides the foundation for human motivation, well being and personal accomplishment. Typically self-efficacy belief helps foster the outcome one expects. Confident individuals anticipate the successful outcome. This theory is relevant to student motivation in that students who are confident in their academic skills expect high marks in exams and expect the quality of their work to reap academic benefits. The opposite is true of those who lack confidence as such students envision low grades even before they begin an exam or course (Zhengli Xie *et al.*, 2022)

Two Factor Theory: According to Herzberg, two kinds of factors affect motivation, and they do it in different ways: *hygiene factors.* These are factors whose absence motivates, but whose presence has no perceived effect. They are things that when you take them away, people become dissatisfied and act to get them back. A very good example is heroin to a heroin addict. Long term addicts do not shoot up to get high; they shoot up to stop being sick to get normal. Other examples include decent working conditions, security, pay, benefits (like health insurance), company policies, interpersonal relationships. In general, these are extrinsic items low in the Maslow/Alderfer hierarchy. *Motivators.* These are factors whose presence motivates. Their absence does not cause any particular dissatisfaction, it just fails to motivate. Examples are all the things at the top of the Maslow hierarchy, and the intrinsic motivators. So hygiene factors determine dissatisfaction, and motivators determine satisfaction. The two scales are independent, and you can be high on both. If you think back to the class discussion on power, we talked about a baseline point on the well-being scale. Power involved a threat to reduce your well-being, causing dissatisfaction. Hence, power basically works by threatening to withhold hygiene factors. Influence was said to fundamentally be about promising improvements in well-being

when you are influenced to do something, it is because you want to, not because you were threatened. Influence basically works by offering to provide motivators (in Herzberg's terms).

4.1.5 Equity Theory: Suppose employee A gets a 20% raise and employee B gets a 10% raise. Will both be motivated as a result? Will A be twice as motivated? Will be B be negatively motivated? Equity theory says that it is not the actual reward that motivates, but the perception, and the perception is based not on the reward in isolation, but in comparison with the efforts that went into getting it, and the rewards and efforts of others. If everyone got a 5% raise, B is likely to feel quite pleased with her raise, even if she worked harder than everyone else. But if A got an even higher raise, B perceives that she worked just as hard as A, she will be unhappy.

In other words, people's motivation results from a ratio of ratios: a person compares the ratio of reward to effort with the comparable ratio of reward to effort that they think others are getting. Of course, in terms of actually predicting how a person will react to a given motivator, this will get pretty complicated:

People do not have complete information about how others are rewarded. So they are going on perceptions, rumors, and inferences. Some people are more sensitive to equity issues than others. Some people are willing to ignore short-term inequities as long as they expect things to work out in the long-term.

EVALUATION AND JUSTIFICATION OF MOTIVATIONAL THEORIES

While various theories offer valuable insights, each presents a unique perspective, revealing a portion of the intricate picture. Attribution Theory explores how individuals, seeking to maintain a positive self-image, attribute success to internal factors but externalize blame for failures. Goal Orientation Theory delves deeper, differentiating between goals driven by learning (mastery-oriented) and those fueled by outperforming others (performance-oriented). Building on this individual-centric approach, Self-efficacy Theory underscores the critical role of self-belief in motivation, emphasizing the internal locus of control.

Shifting focus to the workplace, Two Factor Theory differentiates between factors that simply prevent dissatisfaction (hygiene factors, like salary) and true motivators (like challenging work) that drive satisfaction and engagement. Finally, offering a social perspective, Equity Theory highlights how perceived fairness in rewards, compared to others' efforts and rewards, significantly impacts individual motivation.

However, acknowledging these valuable contributions, it's pertinent to acknowledge the limitations of each theory. Some, like Attribution Theory and Goal Orientation Theory, might overemphasize individual aspects, potentially overlooking external influences. Additionally, Two Factor Theory and Equity Theory may struggle with generalizability beyond specific contexts or oversimplify complex motivational dynamics.

Ultimately, a comprehensive understanding of motivation necessitates a multifaceted approach, integrating insights from various theories while acknowledging the significant influence of cultural, educational, and individual differences. Recognizing these limitations and embracing different perspectives provides the foundation for a more nuanced comprehension of the diverse factors shaping human motivation.

MOTIVATIONAL THEORIES IN ACTION: ENGAGING BASIC SCIENCE LEARNERS

Even in the early stages of education, teachers can leverage the power of motivational theories to create a thriving learning environment for basic science. Here's how some of the discussed theories can be applied in practical ways:

ATTRIBUTION THEORY:

"Effort Badges" go beyond traditional grading: While grades have their place, they can overshadow the effort students put into learning. By awarding small, symbolic badges that recognize perseverance and hard work alongside good grades, teachers acknowledge the effort it takes to succeed, especially in challenging topics. This reinforces the crucial link between effort and achievement, fostering a growth mindset and encouraging students to view mistakes as learning opportunities.

"I Can" Statements empower learners: Before diving into a new concept, encourage students to verbalize their goals using statements like "I can identify the phases of the moon" or "I can design an experiment to test the effect of temperature on plant growth." This simple practice empowers students and instills a belief in their abilities to master new information. By owning their learning goals and actively engaging with the material, students are more likely to embrace challenges and persevere in the face of difficulties.

GOAL ORIENTATION THEORY:

"Science Fair Showcase" ignites competition and collaboration: Organize a science fair where students can create projects showcasing their understanding of learned concepts. This activity not only allows students to demonstrate their mastery of the material in a creative way but also fosters a sense of healthy competition as they strive to showcase their best work. However, to ensure inclusivity, the focus should be on the learning journey and the scientific process rather than solely on winning. Additionally, consider incorporating a "learning buddy system" where students with different strengths and learning styles work together on projects. This fosters collaboration, allows students to learn from each other's perspectives, and caters to both mastery and performance goals, appealing to diverse learning motivations.

SELF-EFFICACY THEORY:

"Science Expert of the Day" builds confidence: Empower students and build confidence in their understanding by designating a "science expert" each day. This student can lead a short review activity, answer classmates' questions, or present interesting science facts they've researched. This simple act of recognizing student knowledge and expertise empowers them to take ownership of their learning and fosters a sense of pride in their achievements.

"Challenge Accepted!" reframes obstacles: When students encounter difficulties, instead of viewing them as setbacks, use the phrase "Challenge accepted!" to frame challenging tasks as exciting opportunities for learning and growth. This reframing helps students see themselves as capable problem solvers and encourages them to approach difficult concepts with a positive and determined attitude.

TWO FACTOR THEORY:

"Mystery Science Experiments" tap into natural curiosity: Move beyond rote learning and textbook exercises by designing engaging, inquiry-based experiments. These "mystery science" activities can involve predicting outcomes, observing phenomena, and explaining findings. By

fostering curiosity and allowing students to actively participate in the scientific process, teachers tap into their intrinsic motivation to explore and discover, making learning fun and engaging.

"Science in Action" presentations connect science to real-world scenarios: Invite scientists or professionals who use science in their careers to visit the classroom and share their experiences. These visits not only provide valuable insights into diverse applications of science but also showcase the practical value of scientific knowledge in the real world. This can spark students' interest and motivate them to see the relevance of science to their own lives and future aspirations.

EQUITY THEORY:

"Multiple Intelligences Activities" cater to diverse learners: When designing lessons and activities, consider the "multiple intelligences" framework, acknowledging that students learn and process information in different ways. Incorporate activities that cater to visual, auditory, kinesthetic, and other learning styles. This ensures all students have equal opportunities to engage with the material, showcase their unique strengths, and feel valued for their contributions to the learning environment.

"Culturally Relevant Science" fosters inclusivity: Whenever possible, connect science concepts to students' cultural backgrounds and experiences. This could involve incorporating culturally relevant examples into lessons, using local stories and traditions to explain scientific phenomena, or inviting guest speakers from diverse backgrounds to share their scientific journeys. By making science relatable and relevant to students' lives, teachers foster a sense of inclusivity and demonstrate the universality and importance of scientific inquiry for everyone.

CONCLUSION AND RECOMMENDATION

In conclusion, this study explored motivation theories in elementary science education and specifically unearthed five prominent theories: Attribution, Goal Orientation, Self-Efficacy, Two-Factor, and Equity. The findings determined that student achievement is intricately influenced by perceptions of success/failure, learning goals, belief in self, classroom response, and perceptions of fairness. The intricacy of motivation by personal and environmental determinants explicates the difficulty inherent in fostering student engagement. However, the study identified limitations in every theory, necessitating an integrated approach. By synthesizing multiple frameworks and embracing individual, cultural, and educational context differences, educators are able to tailor interventions to student diversity. Recommended interventions include the cultivation of intrinsic motivation, growth mindset, student agency, and an equitable and inclusive classroom environment. In these ways, teachers can expect to unleash the passion and excitement of students for science learning.

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