Conceptual Article

Beyond school grades: Measuring students' learning outcomes and the emergence of achievers and underachievers

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The achievement of positive learning outcomes is central to students' educational experience. Various important issues in students' learning outcomes are prevalent in the educational landscape. These issues encompass the significance of using valid and reliable assessments, the mounting pressure on accountability, the necessity for equal access to high-quality education, and the utilisation of technology. Additionally, there is a growing awareness of the importance of preparing students for the demands of the 21st-century workforce, which requires a broader range of competencies beyond traditional academic skills. It is essential to address these issues by continually focusing on and working together among educators, policymakers, and researchers to improve student learning outcomes. This article provides an overview of learning outcomes and the emergence of achievers and underachievers in educational settings. The first section defines learning outcomes and discusses the benefits of stating expected learning outcomes and guidelines for developing good statements. The article then explores the differences in cognitive functioning between achievers and underachievers, along with the classification and identification of these groups through a literature review. The next section delves into the relationship between learning outcomes and the emergence of achievers and underachievers, including factors contributing to students' under- and over-achievement. These factors include home conditions, peer relations, physical and mental well-being, psychological state, academic inclinations, and aspirations and prospects. Finally, the article discusses teachers' important role in improving student learning outcomes. In conclusion, teachers can provide targeted interventions and support to improve their learning outcomes by understanding the factors contributing to students' successes and failures. The paper has significant implications for educators, policymakers, and researchers and can contribute to developing effective educational interventions to improve student success.

Keywords: Affective, cognitive, psychomotor, student achievement, teacher role

1. Introduction

Every parent or guardian expects to send their children or wards to school to acquire literacy for self-relevance and community development. Schools, at all levels, are designed to offer learners contents and experiences that can shape either one or more of their affective, cognitive and psychomotor attributes. The transformation of crude inputs that schools receive from society and the eventual production of the total man cannot be made possible without quality learning. The concept of learning has been explained differently by many scholars attempting its definition. Learning, according to Iheanacho (2015), is "a relatively permanent modification in behaviour potentiality that results from interaction with the environment or experience" (p.6). Learning is also seen as "ontogenetic adaptation – that is, as changes in the behaviour of an organism that results from regularities in the environment of the organism" (De Houwer et al., 2013; p.631).

In his highly influential textbook, Domjan (2010) defines learning "as an enduring change in the mechanisms of behaviour" (p. 17). Likewise, Lachman (1997) typifies learning as a process that underlies behaviour. He argues that learning should not be confused with the product of this process—behaviour change. However, it is realised that providing clear, generally agreed-upon

definitions of complex concepts such as learning is unrealistic. From the definition of De Houwer et al., three components are spotted: (1) changes in the behaviour of the organism; (2) a regularity in the environment of the organism; (3) a causal relationship between the regularity in the environment and the changes in the behaviour of the organism.

Therefore, for anything to be conceived as learning, other key variables that must be present include (a) relative permanence, (b) behaviour change, and (c) experience or practice. All these three ingredients must be present for learning inference to be concluded of individuals under observation. Teachers ensure learners receive the right experiences and content for effective learning. The teacher, in this case, is anyone knowledgeable or experienced enough to guide the learners in either a formal, informal or non-formal setting. Since the teachers, environment, and learners play a role in what is learnt and how learning takes place, it is pertinent to discuss what constitutes learning outcomes, how they can be measured, and how achievers and underachievers can emerge from this process.

2. The Concept of Learning Outcome

Like most other terms, 'learning outcome' means different things to different writers. Notably, two schools of thought exist in conceptualising what constitutes learning outcomes and how they can be measured. The first school represents those that view learning outcomes as objective instructional statements made by teachers about what students should be able to do in each lesson. The second school view learning outcomes as a product of what learners have learnt. According to the first school, learning outcomes are statements that specify in precise terms what learners shall understand and what skills or capacities they will have at the end of a specific period of learning (Hussey & Smith, 2002; Kennedy, 2006). They are usually expressed as knowledge, skills or attitudes and explicitly describe what learners should understand and be able to demonstrate because of learning. Furthermore, Hussey and Smith (2002) disclosed that aims and objectives could be specified with exactness but are tainted with subjectivity and interpreted as statements of what teachers want, hope, or aspire to achieve (Hussey & Smith, 2002).

The second school sees learning outcomes as the minimum performances required to complete a course or programme and may be considered exit behaviours. It refers to learners' observable and measurable knowledge, skills, and attitudes after a learning encounter (Robert & Owan, 2019). Robert and Owan further advanced that learning outcomes do not necessarily imply students' performance in a test since test performance is just an index (amongst several others) that can be used to assess the learning outcomes of learners. For the sake of objectivity, there is a need to be able to specify observable products of the activities of the educators: i.e., learning outcomes. These can be seen as the products of the learning process within the students (Gagne, 1974; Ing, 1978) and can be directly related to assessment. According to Allan (1996), outcomes emphasise student achievement and affirm that curriculum planning should begin with what is learnt rather than what is taught. It is acknowledged that there is a dichotomy between learning outcomes and teaching intentions. However, defining and expressing learning outcomes should enable teachers to reflect upon what they intend their students to learn and thereby articulate the relationship between what they teach and what students do, in fact, learn.

Generally, there is a relationship between the ideas of the first and second schools of thought, but the difference is in the view of the concept. The first school sees learning outcomes as mere statements of intent of what teachers think students should learn, making it teacher-centred. On the other hand, the second school believes that learning outcomes transcend mere statements of intent to the actual observations of modified behaviours, making it both teacher- and student-centred. The aim is not to support one school over the other but to add that learning outcomes are actual manifestations of expected behaviours. However, the teacher or the curriculum mostly determines what constitutes an expected behaviour. It must be noted that students can learn things outside areas of expectations in a given lesson. Since assessments are often based on areas of expectations (learning objectives), a student failing a test does not imply a lack of knowledge of the subject. It could mean that the test did not focus on the areas of interest to the learners. Therefore,

teachers must strive to create a balanced approach to learning outcomes considering both teacher and student perspectives. The focus should be on ensuring students acquire the knowledge and skills they need to succeed, not just on meeting predetermined objectives. Teachers must recognise that students may have different interests and learning styles, and assessments should reflect that diversity. Therefore, teachers should consider using various assessment methods to evaluate student learning, including performance-based assessments, portfolios, and self-reflection activities. By using a range of assessment methods, teachers can provide a more accurate and comprehensive picture of students' learning outcomes and ensure that assessments align with the actual learning that has taken place.

3. Developing Good Statements of Learning Outcomes for Effective Measurement, Assessment and Evaluation

This section provides a guide on factors educators should consider when developing statements of expected learning outcomes. It provides a blueprint for educational practitioners to measure, assess and evaluate students learning outcomes across the three domains of learning.

Specificity is crucial for effective measurement. Statements of learning outcomes should define what skills the students should demonstrate, know, and produce upon programme completion (Rao, 2020). By being specific, the programme assessors can accurately measure the students' progress and achievement. Exclusive learning outcomes help minimise the chances of ambiguity in their assessment. This way, the students will know exactly what they are supposed to learn and what is expected of them.

Learning outcomes should be realistic and attainable to the students' abilities, initial skill sets, and developmental levels. This helps ensure that the students are not overwhelmed with expectations beyond their abilities. The time available for students to learn should also be considered when developing learning outcomes (Hamilton et al., 2021). When creating learning outcomes, it is important to keep them in line with what is being taught so that students can achieve them with the instruction they receive.

Learning outcomes should be written in the future tense, focusing on what the students can do after instruction. They should be active and observable, making it easier to measure their effectiveness. This helps in measuring student progress and assessing the effectiveness of the instruction they receive (Adom et al., 2020). Using active verbs in the future tense sets a clear expectation for what students will achieve in the program.

Learning outcomes should relate to program goals rather than specific course goals. Addressing the program goals helps ensure that the students are progressing towards the program's intended outcomes. This also helps to standardise assessment across all courses in the program. Focusing on program goals makes evaluating the programme's performance against the set objectives easier.

A sufficient number of learning outcome statements should be included in the assessment plan (typically between three and five). Fewer than three will not provide enough information to make improvements, while more than five may be too complicated to assess. Including too many learning outcomes can lead to confusion in the assessment process, which will not provide clear feedback to students on their progress.

Learning outcomes should focus on what students are expected to produce or demonstrate rather than on what the faculty intends to do during instruction. This makes it easier to measure students' progress and achievement, as the assessment will focus on what the students can demonstrate or produce upon completion of the program. The faculty's intentions do not provide clear feedback to students on their progress, making it necessary to have specific learning outcomes (Atkinson et al., 2022).

Learning outcomes should be communicated clearly to students: Doing this will help students understand what is expected of them and can track their progress toward achieving the outcomes. Clear communication of learning outcomes helps students understand the programme's

purpose and how it can benefit their careers. Students who understand what is expected of them are more likely to take ownership of their learning and work to achieve the outcomes. Providing students with regular feedback on their progress toward achieving the outcomes can also help them stay motivated and engaged (Stone & Springer, 2019).

Learning outcomes should be regularly reviewed and updated to ensure that they remain relevant and appropriate for the program and its students. As the needs of students and the industry change over time, it is important to ensure that the learning outcomes remain relevant and appropriate. Regular review and updating of the outcomes help ensure that the program meets the needs of students and the industry (Tri et al., 2021). This review can also help identify areas where the programme needs improvement.

Learning outcomes should be assessed using multiple methods and sources of evidence to ensure that they are valid, reliable, and meaningful. Multiple methods and sources of evidence help to ensure that the assessment results are accurate and reflect what students have learned. This also helps to minimise the impact of any one assessment method or source of evidence. Using multiple methods and sources of evidence also helps to ensure that the assessment results are meaningful and can be used to guide program improvement (Montenegro & Jankowski, 2020).

Learning outcomes should be transparent and accessible to all stakeholders, including faculty, staff, students, and external partners. Transparency and accessibility of learning outcomes help to promote understanding and support for the program's goals. It also helps to ensure that everyone involved in the program understands what is expected of students and how the program can benefit them. This transparency can also build stakeholders' trust and promote collaboration and cooperation to achieve the program's goals (Barrane et al., 2021).

4. Measuring Students' Learning Outcomes

Measuring learning outcomes effectively depends on the assessor and how learning outcomes are defined in a given context. Recall that two schools of thought view what constitutes learning outcomes differently, ushering in differences in how learning outcomes can be measured. To those who view learning outcomes as objectives or statements of intent, learning outcomes will reflect the degree to which students are responsive during and at the end of the lesson encounter to such indicators. This means that the attainment of the short-term lesson objectives is a measure of learning outcomes in that context (Robert & Owan, 2019). Those who view learning outcomes as the production of the total man will look beyond the mere attainment of classroom learning objectives to determine whether the goals of the educational system (at a given level) are attained and the extent of such attainment. Both approaches to measuring learning outcomes are complementary and important. While one focuses on the short-term, leveraging formative evaluation for diagnostic purposes, the other is more summative for placement purposes (Owan, Ekpenyong et al., 2023). Interestingly we can only have a good long-term learning outcome with short-term evaluation activities.

This drives us to another perspective of measuring learning outcomes regarding learning domains (whether in the short- or long-term). It is important to reiterate that learning is a relatively permanent change in behaviour through experience and/or practice. These changes can occur in either one or more of the three domains of learning – affective, cognitive and psychomotor. Measuring learning outcomes across these three domains requires different tools and approaches due to differences in domain requirements. Since there are differences in what each domain constitutes, the expected manifestations of learning and the instrument that can be appropriately used to collect data about such manifestations, an assessment of learning should be inclusive (Bassey et al., 2019; Ekpenyong et al., 2022, 2023). Generally, tests are used for measurement across the three domains. Nevertheless, different tests are used to measure learning outcomes for each domain.

Learning outcomes in the cognitive domain can be measured using achievement, intelligence, aptitude and ability tests, interaction schedules, student learning inventories and so on. In the

affective domain, learning outcomes may be measured using personality, attitude, neuropsychological, projective and emotional intelligence tests, rating scales, self-reports, semantic differential scales, interviews, observations, checklists, questionnaires, Thurstone scales, sociometry, supporting documents and so on. Furthermore, learning outcomes can be measured in the psychomotor domain using rating scales, checklists, observation tests, Thurstone scales, performance tests and supporting documents. Generally, these tests (regardless of the domain) can take different forms (oral or written), serve different purposes (prognostic, diagnostic, power, speed, accuracy, quality, ranged), be organised differently (essay or objective), taken at different period or frequencies (daily, weekly, monthly, termly, annually), may require different duration (short or long) and different method of scoring (standardised or non-standardised).

These tests can assess students' formative and summative learning outcomes. Formative tests (regardless of the type) can measure one or more specific subjects and objectives to obtain a picture of students' absorptions of the subject. The test results measure the teaching and learning process within a certain time (Cifrian et al., 2020). On the other hand, summative tests could be used to determine how much students have learnt upon completing a programme of interest. Summative assessment can also be useful in tracking the long-term attainment of learning outcomes and is based on a cumulation of different formative assessment results (Oranje et al., 2019). The results of this summative test are used to sustain, modify or improve the overall activities for programme effectiveness. For good measure of learning outcomes, assessments should focus on students' cognitive, affective and psychomotor domains (Ekpenyong et al., 2022, 2023; Owan, Ekpenyong et al., 2022).

Regrettably, the assessment of learning outcomes in Nigeria has, over the years, often dwelt on the cognitive domain, with little or nothing in the affective and psychomotor domains. Admittedly, these outcomes, often measured using the cognitive-based test, directly estimate students' intellectual ability and are considered a powerful tool for evaluating the institutional impact on students (Kuh et al., 2006). However, when summative evaluation is focused on just one domain for decision-making on the total man, it provides misleading results. Consequently, Bassey et al. (2019) explained that a so-called 'first-class' student might be ranked differently if other domains of learning were measured and included in the build-up to the cumulative grade point average used for the final decision/ranking. Thus, a good evaluation of learning outcomes should base decision-making on information collected about the learners' affective, cognitive and psychomotor skills.

Buttressing this, Hussey and Smith (2002) explained that teaching could be tied to assessment with unprecedented precision once learning outcomes can be designed to measure what students can do and not only what they should know. They added that doing this will enable teachers to draw up assessment criteria which can then be distributed to assessors and assessee alike; the whole process, being explicit and transparent, can now be audited, and the performances of both teachers and students can be evaluated. To achieve this, Hussey and Smith prescribed that teachers' ability to distinguish between generic, specific, basic, transferable, and non-transferable skills, different kinds of knowledge and understanding and so forth (all specifiable as outcomes) can enable them to provide an objective assessment. It is through an objective assessment of learning outcomes that an instructor can identify "achievers" and "underachievers" (two concepts that will be clarified in the next section).

5. The Concept of Achievers and Underachievers

Like most concepts, there is no precise definition of an achiever or underachiever in the literature. Consequently, some studies rely only on standardised measures to identify the phenomena (Supplee, 1990), while others emphasise student classroom activities (Baum et al., 1995). Achievers receive very good grades despite unassuming scores on general intelligence tests (Wen et al., 2016). A high-achiever is a student who is good at passing assessed tasks, whether academic or professional, with access to the scheme determined (in most cases) by grades (Flint et al., 2022).

This implies that high achievers consistently rank in the upper echelons of achievement, having set lofty objectives for themselves and exercising extreme self-discipline to achieve those objectives.

Other attributes of high achievers are: they are very goal-oriented and disciplined in the long run (Cools et al., 2019); they excel in life and prefer to establish ambitious targets and keep pushing until they are finally realised; they have an unshakeable conviction of being in charge of their destinies; often pursue academic, career or professional developments on their own (Flint et al., 2022); possess advanced academic and study skills; take control readily and demonstrate natural leadership characteristics – frequently helping other students reach their objectives; want to be the "go to" person in the class, school, or wherever they find themselves and are prepared to put in the time and effort to become that person; they consistently perform at a high level and often attribute their success to factors within their power. However, it can be challenging to handle these sorts of individuals. The pursuit of perfection is a common trait among top achievers.

For instance, their need for perfection might be a hindrance to efficiency. They could need help reaching out for help when needed and are typically hesitant to give out assignments to others (believing that no one can do them as well as they can). Some students who consistently perform at the top fear their success will put others down or give them false hope. Other great achievers may begin to shun activities whose success is questionable if they begin to fear that they will not be able to live up to their reputation indefinitely. Consequently, they may value safety and comfort more than novelty and challenge, eventually leading to a professional plateau. Some other high achievers may be very competitive. While a healthy level of competition is important to reach new heights, unhealthy levels of competitiveness may lead to stress and lower morale.

On the other hand, underachievement has been defined as a gap between the predicted and actual performance based on some standardised measure of ability (e.g., Davis & Rimm, 1989; Dowdall & Colangelo, 1982; Peterson & Colangelo, 1996; Whitmore, 1980). Therefore, underachievers are "students who exhibit a severe discrepancy between expected achievement (as measured by standardised achievement test scores or cognitive or intellectual ability assessments) and actual achievement (as measured by class grades and teacher evaluations)" (Reis & McCoach, 2000, p.157). Also, underachievers are students whose academic achievements fall short of their predicted cognitive abilities (Wen et al., 2016). When bright students fail to reach their potential, they miss exciting new experiences that may propel them to greater knowledge and skill heights (Mofield & Parker, 2019). These learners may be sitting on latent abilities that might explode into spectacular displays of skill (Gagné, 1995). Nevertheless, some students might be described as talented or gifted, but whose grades and entry points profile means they do not get such recognition. This group are called gifted underachievers, whose achievements may be recognised in other aspects of their lives.

Understanding the characteristics of high achievers and underachievers is important for educators and researchers. They can identify factors contributing to high achievement or underachievement and design effective interventions and support systems for students to reach their full potential. Furthermore, educators can gain insights into motivating and challenging high achievers while helping underachievers close the gap between their actual and expected performance. This can also increase diversity in fields where certain groups may be underrepresented. By creating more inclusive and effective learning environments, educators can help all students succeed. Educators and institutions must recognise and support high achievers and underachievers in their classrooms. Teachers can provide challenging and engaging learning experiences for high achievers while helping them manage their perfectionism and competitiveness. More personalised attention and support may be necessary for underachievers, including individualised instruction, mentoring, and counselling. By recognising and addressing the needs of both groups, educators and institutions can help students achieve academic and personal success.

6. Differences between Achievers and Underachievers in Cognitive Functioning

Achievers and underachievers are two distinct groups of students with significant differences in their cognitive functioning. These differences can impact their academic performance and, ultimately, their future success.

Intelligence. One of the primary differences between achievers and underachievers is their intelligence. Achievers typically have higher IQ scores and demonstrate greater intellectual ability than underachievers (Dings & Spinath, 2021; Inam et al., 2016). They have better problem-solving skills and are more adept at critical thinking.

Learning styles. Achievers tend to be more adaptive and flexible in their learning styles, while underachievers may struggle to adapt to new learning environments or methods (Kpolovie et al., 2014). Achievers are more likely to learn through active participation, while underachievers may struggle with hands-on learning.

Memory and recall. Achievers typically have better memory and recall abilities, which can aid in learning and retaining information (Shieh & Yu, 2016; Weinstein & Underwood, 2014). Therefore, underachievers may struggle with memorisation and recall, impacting their ability to learn and perform well on tests.

Attention and concentration. Achievers are more likely to be able to focus their attention for extended periods, which can help them stay engaged in class and absorb new information (Rabiner et al., 2016). Thus, underachievers may struggle with attention and concentration, making learning and retaining new material difficult.

Self-regulation. Achievers are often better at self-regulation, which includes time management, setting goals, and managing distractions (Yang & Tu, 2020; Zimmerman, 2023). This suggest that underachievers may struggle with self-regulation, leading to procrastination and poor time management.

7. The Divide between Achievers and Underachievers in Affective Behaviours

Below are some affective differences between achievers and underachievers.

Motivation. Achievers tend to have a high level of intrinsic motivation, which means they are driven by internal factors such as personal interest and enjoyment. On the other hand, underachievers tend to have low intrinsic motivation and may be motivated more by external factors such as rewards or punishment.

Self-efficacy. Achievers tend to have a strong sense of self-efficacy, which means they believe in their ability to accomplish tasks. Conversely, underachievers may have low self-efficacy and may doubt their ability to succeed.

Goal setting. Achievers tend to set challenging goals for themselves and have a clear sense of direction. Underachievers, on the other hand, may have difficulty setting goals and may lack direction.

Persistence. Achievers are persistent in the face of obstacles and setbacks and may be more likely to view these as opportunities for growth (Hochanadel & Finamore, 2015). Underachievers may be more likely to give up in the face of obstacles and setbacks.

Emotional intelligence. Achievers tend to have high levels of emotional intelligence, which means they can recognise and regulate their emotions and empathise with others (Halimi et al., 2021). In contrast, underachievers may have lower levels of emotional intelligence, which can lead to difficulty managing emotions and building positive relationships.

Coping strategies. High achievers tend to have effective coping strategies, such as seeking support from others, problem-solving, and positive self-talk, which help them manage stress and challenges (Mehta & Sharma, 2015; Sumner, 2022). On the other hand, underachievers may rely on avoidance or maladaptive coping strategies, such as procrastination, self-blame, and substance use, which can hinder their performance and well-being.

Goal orientation. High achievers tend to be mastery-oriented, focusing on improving their skills and knowledge rather than demonstrating their abilities or outperforming others (Wang & Rao, 2022). On the other hand, underachievers may be more performance-oriented, meaning they are primarily concerned with attaining high grades or impressing others rather than with learning and growth. This can lead to a fear of failure and a reluctance to take risks.

8. The Dichotomy between Achievers and Underachievers in Psychomotor Abilities

Achievers and underachievers also differ in their psychomotor abilities. Psychomotor abilities refer to the coordination between the mind and body to perform physical actions.

Coordination. High achievers have better hand-eye coordination and fine motor skills than underachievers (Koul et al., 2023). They can manipulate objects more efficiently and easily perform tasks that require precision.

Speed. Achievers are faster in their movements and reactions than underachievers (Badger et al., 2022). They can process information quickly and respond to it more efficiently.

Stamina. Achievers have better physical endurance and can sustain their performance for longer periods without fatigue. This is especially evident in activities that require high levels of physical exertion, such as sports (Munsie et al., 2019).

Agility. High achievers are generally more agile and have better balance than underachievers (Snyder et al., 2019). They can move quickly and change directions smoothly, making them better suited for activities that require agility and speed.

Flexibility. Achievers are more flexible than underachievers, which means they can perform a wider range of movements and adapt to different situations more easily. This can be especially important in activities that require creative problem-solving and improvisation.

Strength. High achievers tend to have greater physical strength than underachievers, which allows them to perform more challenging tasks that require greater physical effort (Tan et al., 2023). This can be an advantage in weightlifting, gymnastics, or martial arts activities.

9. Classification/Identification of Achievers and Underachievers: A Literature Review

There are various ways to identify these students, including standardised test scores, grades, teacher evaluations, and observations. Standardised test scores are commonly used to identify achievers and underachievers. Students who perform consistently well on standardised tests are classified as high achievers, while those who perform below average are classified as underachievers. However, it is essential to note that standardised test scores are not the only determinant of student achievement and may not always provide a comprehensive picture of a student's abilities. Grades are another way to classify achievers and underachievers. Students who consistently receive high grades are classified as high achievers, while those who receive low grades are classified as underachievers. However, grades can be subjective and may not always reflect a student's abilities and potential. Teacher evaluations and observations are also used to classify achievers and underachievers. Teachers observe students' behaviours, interactions, and work habits to determine their level of achievement. Teachers can identify struggling students and provide additional support and resources to help them improve their performance.

However, the difference method (e.g., Lau & Chan, 2001) and the regression method (e.g., Cone & Wilson, 1981) have been used to compare standardised measures of cognitive abilities and achievement scores. The difference method involves subtracting the two measures. In contrast, the regression method involves calculating the residuals in a regression of the achievement measure on the aptitude measure to avoid regression to the mean. Underachievement is inferred from the resultant difference or residuals, and a threshold is established to identify the most significant instances. Rasch models have been employed as a more contemporary, nuanced version of this reasoning (Phillipson, 2008). The absolute split strategy is an alternative way to identify underachievers by establishing quantitative thresholds for low and high IQ and low and high

grades; students with both high IQ and poor grades are considered underachieving (Dings & Spinath, 2021).

There have been different classifications for achievers and underachievers among scholars. For instance, Peterson and Colangelo (1996) classified achievers and underachievers using their grade points average as follows: high achievers (HA), GPA ≥ 3.75, and moderate achievers (MA), GPA = 3.35-3.74, moderate underachievers (MU), GPA = 2.75-3.34, and extreme underachievers (EU), GPA < 2.75. Similarly, Rayneri et al. (2003) classified Students with academic grade-point averages (GPAs) below 85 on a 100-point as low-achievers and those with 90 or above as achievers.

Mofield and Parker (2019) identified intellectually gifted students based on three eligibility criteria of the state: (a) high full-scale IQ (130 or above and at the 96th percentile or above on one standardised academic achievement test composite score or 90% or higher on two composite scores; (b) full-scale IQ of 123–129 and two composite scores on a standardised achievement measure above the 95th percentile or three composite scores above the 90th percentile, and qualifying characteristics or creative thinking; or (c) full-scale IQ of 118–122 and three composite areas on a standardised achievement measure above the 95th percentile or four composite areas above 90th percentile, and a qualifying score on a measure of gifted characteristics or creative thinking.

10. Learning Outcomes and the Emergence of Achievers and Under-Achievers

Each learner comes to school with a unique set of experiences and information. This diversity is a challenge for educators, who must help students reach their full potential while considering how their varied backgrounds, experiences, and perspectives shape their learning and growth. Suppose teachers are in a difficult position to use their limited resources best; they may be tempted to believe their best students do not need any more help since they are already successful (Bannister, 2016). However, it is yet to be discovered whether these children's performance gains cease with time or if they maintain their edge over their peers (Neuendorf et al., 2020). Therefore, students' learning outcomes become very useful in identifying how much learners have achieved and could be used to study the trend of achievement over time to determine achievement gaps among high and low-ability students. This section will discuss how different stakeholders can use learning outcomes to determine whether a student or group of students are achievers or underachievers.

Earlier in this paper, learning outcome was discussed as the observable behavioural changes that learners exhibit after interfering with lesson contents and experiences in line with predetermined objectives or expectations. A review of related literature shows that achievers and underachievers can only be identified with learning outcomes (Owan et al., 2022; Snyder et al., 2019; Tan et al., 2023). For instance, to identify a high-achieving student, such a student must first take aptitude, intelligence, ability, or other tests before taking a course or during admission. These tests are usually administered to obtain baseline data about students' ability levels. After scoring and interpretation, test results are used to determine students' ability or intelligence levels and for placement purposes.

Assuming this test was conducted before entry to a university programme (such as the unified tertiary matriculation examination [UTME] or aptitude test), a student's score in such a test determines how well they mastered what was taught in secondary schools. Thus, through the outcome of the entrance examination, cut-off points can be used to determine who gets administered and to identify students with high, moderate and low abilities. After gaining admission, students are further exposed to learning experiences in their chosen areas of study. Upon completing some courses, they (students) may be subjected to a test in one or more courses to determine how well they have learnt (learning outcomes). Students' test or examination results (in different courses) could be compared with the baseline data, aptitude test results or other standardised measures of ability. From the learning outcomes in both the standardised test (criterion-reference test) and course examination (norm-reference test), different groups of achievers will emerge, such as high achievers, moderate achievers, low achievers, and no achievers. Similarly, we could also have under-achievers and overachievers that can be further

classified into high, moderate or low categories (such as high, moderate and low under-achievers; high, moderate or low overachievers).

High achievers are those students who attain high standards that tally or correlate with their predicted outcomes (intelligent quotient [IQ]) (Isnain, 2021; Wiratna & Hamdiah, 2020). In other words, they are students that score very high points or marks in both the criterion- and norm-reference tests. For example, students scoring between 70 and 100% of the marks in UTME and norm-reference tests could be considered high achievers. Moderate achievers, just like high achievers, attain moderate success that falls within the range of their IQ scores (Nalbone et al., 2023). For example, students scoring between 50 and 69% of the marks in UTME and norm-reference tests could be considered moderate achievers. Low achievers are those that perform marginally higher than the pass mark in normed- or criterion-reference tests (Owan et al., 2023). In fact, they have been predicted to obtain such grades because of their IQ levels. These represent those students in the category of the popular phrase "let my people go." For example, students with UTME and norm-reference test scores between 40-49% of the marks can be regarded as low achievers from our illustration. No achievers are those whose IQ scores suggest they will fail and eventually fail as predicted from their results in the criterion-reference test (Ekpenyong et al., 2023). From our UTME illustration, we could define "no achievers" as those with scores below 40% in both tests.

Two special groups of students can emerge based on their learning outcomes - overachievers and underachievers. Therefore, we can identify achieving and non-achieving students using their learning outcomes compared to a standardised measure of their ability. A student who excels academically above what their IQ would predict is considered an "overachiever". These are students whose criterion-reference test scores suggested they would perform below what they actually attained in school. Overachievement is a situation where the predicted learning outcome of students is below their actual learning outcome (Ding & Zhao, 2020; Forsblom et al., 2022). For example, a student predicted to graduate with a second-class lower eventually graduates with a first-class degree. Underachievers are students who do not do as well as the teacher, relatives, or peers expect them to, given their intellect. They are the opposite of overachievers. Underachievers emerge if students perform below expectations of what they are previously known (Desmet & Pereira, 2022; Lavrijsen et al., 2022). This trend is very common in the university system in Nigeria, where many students that some lecturers have predicted will graduate with a 'first-class degree' end up achieving less. The gap between such predictions and actual outcomes represents underachievement if the latter is lower.

In summary, learning outcomes are specific statements that describe what learners should know, understand, or be able to do at the end of a learning experience. They are critical to effective teaching and learning, providing clarity and focus for teachers and learners. However, setting learning outcomes can also contribute to the emergence of a dichotomy between achievers and underachievers. This is because the attainment of learning outcomes is often used as a measure of success or failure. Learners perceived to have achieved the outcomes are labelled "achievers," while those who have not been labelled "underachievers." This labelling process can be problematic because it implies that some learners are inherently better or worse than others rather than recognising that learning is a complex and multi-faceted process influenced by a wide range of factors, including prior knowledge, learning style, motivation, and access to resources (Owan, Abang et al., 2023).

Additionally, using learning outcomes as a measure of success or failure can create a narrow and rigid definition of what it means to learn. This may not reflect the diverse ways learners engage with and make meaning from the world around them. Furthermore, an achiever in one of the three learning domains may be an underachiever in the others. That is, while some students can be high achievers across the three domains, others can be high achievers in some domains and underachievers in others. This can lead to a situation where learners who do not fit the prescribed definition of an "achiever" are marginalised or excluded, negatively affecting their self-esteem, motivation, and engagement with learning. Therefore, while learning outcomes are an important

tool for promoting learning and improving educational outcomes, they must be used in a way that recognises and values the diversity of learners and their unique strengths and challenges (Ekpenyong et al., 2023). This can help create a more inclusive and equitable learning environment where all learners can achieve their full potential. Various factors are responsible for students' overachievement, normal achievement, underachievement and no achievement. These factors will be discussed in a subsequent section.

11. Factors Responsible for Students' Underachievement or Overachievement

Several conditions and factors are responsible for students' normal achievement, overachievement and underachievement in schools. These include:

Home Conditions. The home environment and activities of students have a significant impact on their academic achievement. Changes in the home environment can lead to underachievement in highly intelligent and talented students. These changes can occur in areas such as nutrition, love, material and social support, parental involvement, and economic situations. High achievers may become underachievers if they experience circumstances that make their educational environment less supportive. On the other hand, a low-achiever can become an overachiever if their home environment changes in ways that improve their study practices. Studies have indicated that underachievers receive less parental support at home, whereas parents of high achievers are more invested in their children's success, regularly engaging in activities such as reading, playing, and attending school events with their children (Dings & Spinath, 2021; Kurtz & Swenson, 1951).

Peer Relations. The popular saying "show me your friend, and I will tell you who you are" can be used to explain the role of peers in promoting over- or under-achievement among learners. A high achiever that associates with peers that are also high achievers might sustain his learning achievement status. However, a high achiever might become an underachiever if he associates with peers that mislead them into understudying. Similarly, low/no achievers might overachieve because of their ties in relating with peers with high regard for academic excellence. Most students have achieved beyond their ability because they later met good friends who supported and encouraged them to be studious and vice versa.

Physical and mental well-being. Health is a very important factor in the success or failure of students (Owan et al., 2022). Therefore, most students perform highly or poorly due to physical or mental health conditions. Overachieving students can emerge because they have gotten over or regained from an underlying health condition that persistently made them underperform below their actual abilities in the past. However, after recovery, they are physically and emotionally fit to attend classes, do their homework, study, exercise, and participate fully in classroom activities, thus, improving their learning achievement from the baseline. Besides, a recent study has shown that "Mental health problems during the transition from kindergarten to elementary school are associated with academic underachievement at the end of elementary school" (Schuurmans et al., 2022, p.578). Similarly, another study proved that students' health significantly predicts their cognitive, affective, psychomotor and overall learning outcomes in secondary schools (Owan et al., 2022).

Psychological state. Students' psychological dispositions could affect how well they learn and achieve in school. Psychological factors such as interest, motivation, attitude, anxiety, stress, depression, emotions, mood swings and empathy, among others, occasionally change among learners. Such psychological changes could also make them switch from underachievers to overachievers and vice versa. Studies have shown that a minor level of motivation is linked to underachievement among students (Dunlosky & Rawson, 2012; Schick & Phillipson, 2009). In addition, Castejón et al. (2016) also found that high-achieving students scored significantly higher than low-achieving students on learning techniques, academic and personal self-concept, connection with parents, honesty, and personal stability. Similarly, Heyder et al. (2017) identified self-concept, motivation, prior performance, and family traits as key factors for overachievement. Furthermore, Gilar-Corbi et al. (2019) reported that high-achieving students possessed better goal

orientations, learning strategies, perceived parent involvement, self-concept, and favourable attitudes toward teachers.

Academic inclinations. Students' level of involvement in academic-related activities is called academic inclinations. High-achieving students tend to exhibit greater concern for their study habits, academic lifestyle, and interest in school activities. They typically derive more enjoyment from reading and are comfortable in traditional classroom settings. Additionally, some high achievers have an innate inclination to prioritise their studies. Changes in academic engagement can significantly impact academic performance, causing high achievers to become underachievers or low achievers to become overachievers. For instance, a student who performs well in academics may start to underachieve over time if their academic engagement declines, and the opposite could also occur.

Aspirations and prospects. Students' career ambitions and prospects can significantly affect their academic performance. Students with a strong desire for future success are more likely to work hard and remain focused on their long-term goals. On the other hand, students who lack long-term career ambitions may not be as motivated and may lack focus in their academic pursuits. A shift in focus away from long-term goals can result in a decline in academic performance, turning a high achiever into an underachiever. Conversely, a no/low achiever who discovers the importance of goal-setting can experience a significant increase in academic performance, resulting in overachievement.

Socioeconomic status. A student's socioeconomic status (SES) refers to their family's income level, occupation, and education level and can significantly impact their academic performance. Students from low-income families often have limited access to educational resources, such as tutoring or test prep courses, which can put them at a disadvantage compared to their more affluent peers. Additionally, students from low-income families may struggle with basic needs like food, housing, and healthcare, which can interfere with their ability to focus on schoolwork. For example, a student who is hungry or worried about their family being evicted from their home may have difficulty concentrating in class.

Cultural and linguistic diversity. Schools with diverse student populations may face unique challenges related to cultural and linguistic diversity. Students from different backgrounds may have different learning styles, expectations, and experiences that can impact their academic performance. For example, students who speak English as a second language may struggle to understand the teacher or communicate with their classmates, making it hard for them to learn and participate in class.

Classroom environment. The classroom environment refers to the physical and emotional atmosphere of the classroom, including factors such as classroom layout, teacher-student interactions, and peer relationships. Teachers who create a supportive, engaging, and inclusive classroom culture can foster a positive learning environment that supports student success. For example, a teacher who encourages students to work together and provides positive feedback can help to build students' confidence and motivation.

Teacher quality. Teachers play a critical role in student achievement, and the quality of teaching can vary widely across schools. Teachers who are skilled, experienced, and passionate about their work can make a significant difference in their students' academic performance. For example, a teacher knowledgeable about their subject area and innovative teaching methods can help engage students and foster a love of learning.

Curriculum and instruction. The quality of the curriculum and instructional methods used in schools can also impact student achievement. Effective teaching methods, well-designed lesson plans, and a rigorous curriculum ensure that students are learning at their full potential. For example, a school that provides a wide range of course offerings and uses teaching methods that cater to different learning styles can keep students engaged and motivated.

12. The Teachers' Role in Improving Students' Learning Outcomes

According to Davis and Rimm (1994), "children are not born underachievers. Underachievement is learned behaviour, and therefore it can be unlearned" (p. 291). The following are some positive recommendations to help educators use learning outcomes to enable their students (especially underachievers) to become achievers.

Provide academic challenges in your classroom. Assign intellectually challenging tasks to high-ability students that allow them to utilise higher-order thinking skills. Gifted students often derive the most enjoyment from the most challenging classes. Ensuring that high-ability students are appropriately challenged in the classroom is essential. They may become bored and disengaged if not given challenging tasks that allow them to use their intellectual abilities fully. Educators can encourage these students to pursue their interests, explore their talents, and take risks. By doing so, educators can create an environment that fosters creativity, innovation, and intellectual growth. Buttressing this, Reis et al. (1995) noted that a "major factor that students attributed to their successful academic achievement was their involvement in honours' classes" (p. 158).

Offer independent projects for students to pursue their interests. Instead of assigning meaningless tasks to students who finish their work early, offer them the opportunity to explore topics beyond the scope of the curriculum that captures their interest. This approach can be counterproductive, as it does not challenge or engage students who have demonstrated proficiency in the subject matter. Instead, a more effective approach would allow students to explore topics that interest them outside the curriculum. This could involve offering a selection of books, articles, or videos on topics related to the subject matter but not included in the curriculum. Emerick (1995) studied young adults and found that "the class that provided opportunities for independent study in areas of interest was believed to promote academic excellence" (p. 20).

Assist underachievers in setting attainable goals. Teachers should avoid comparing students with their peers in a competitive setting. Instead, teachers should express their confidence in the students' abilities and potential for success. Teachers can assist students in acknowledging their accomplishments by supporting them in setting and assessing their objectives (Siegle, 1995). Reis et al. (1995) found that students attributed their academic achievement to teachers who fostered their self-belief, motivation, and overall well-being during their formative years.

Encouraging students to pursue out-of-school interests. Underachievers may begin to realise there is a relationship between their interest areas and academic content. When students struggle to perform well academically, it is often due to a lack of engagement with the content. Many underachievers find it challenging to focus on academic material that they perceive as dry or unrelated to their lives or interests. However, if teachers help students connect their interests with academic content, students may become more invested in the material and, in turn, perform better academically. For example, suppose a student is interested in sports. In that case, a teacher can incorporate sports-related themes into academic content, such as using sports statistics to teach math concepts or sports articles to teach reading comprehension. As Emerick (1995) stated, "school and academic achievement became relevant because of its usefulness in the area of personal interest" (p. 18).

Providing differentiated instruction. Teachers can use various strategies to accommodate students' diverse learning needs in their classroom. These strategies include using different teaching methods, materials, and assessments to meet their students' varied learning styles and abilities. Teachers can also provide individualised instruction to students who need extra support or challenge. Differentiated instruction can help all students reach their full potential and improve learning outcomes (Bondie et al., 2019).

Creating a positive and inclusive classroom culture. Teachers can create a positive classroom environment by fostering students' sense of belonging and respect. They can encourage open communication, provide opportunities for student input, and facilitate positive student

interactions. A positive and inclusive classroom culture can improve students' motivation, engagement, and academic performance (Bassey et al., 2020; Hymel & Katz, 2019; Yu et al., 2021).

Providing timely and meaningful feedback. Teachers can provide students with constructive feedback on their progress to help them identify areas where they need to improve and recognise their strengths. Feedback can be given in different forms, such as peer feedback, self-assessment, or teacher feedback. Timely and meaningful feedback can help students improve their learning and achieve their academic goals (Alique & Linares, 2019; Pardo et al., 2019).

Using technology to enhance learning. Teachers can incorporate technology into their teaching to enhance learning outcomes. They can use technology tools such as educational apps, online learning platforms, and multimedia resources to provide students with engaging and interactive learning experiences. Technology can also help students develop essential digital literacy skills in the 21st century (Owan & Ekpenyong, 2022).

Collaboration with other teachers and stakeholders. Teachers can collaborate with other teachers, parents, and community members to support student learning. They can share best practices, collaborate on projects, and engage in professional development opportunities to improve their teaching practices (Owan, Ameh et al., 2023). Collaboration can help teachers build a supportive network and enhance their teaching effectiveness.

Cultivating a growth mindset. Teachers can help students develop a growth mindset by encouraging them to embrace challenges and mistakes as opportunities for growth and learning. By promoting a positive attitude towards learning and effort, teachers can help students develop resilience and perseverance, which are key to academic success (Walsh et al., 2020). Cultivating a growth mindset can also help students develop a love for learning and a desire to improve.

Providing mentorship and guidance. Teachers can serve as mentors and guide students, especially those struggling academically or personally (Okon et al., 2022). They can provide emotional support and advice and help students navigate academic and personal challenges. Mentorship and guidance help students develop a sense of belonging, build confidence, and improve their academic performance (Apriceno et al., 2020; Naidoo et al., 2021).

13. Conclusion

This paper discussed the concept of learning outcomes and the emergence of achievers and underachievers. Learning outcomes are guiding tools which guide the students to the desired results of the planned course. They also help the teachers identify the path that needs to be followed while making students aware of what they will achieve at the end of the course. A review of related literature shows that learning outcome is very important in identifying high, moderate, low and no achievers. Although the classification of high, moderate, low and no achievement can be subjective, learning outcomes can be useful in determining those in each group, assuming we have adequate information about their previous IQ scores or baseline data. Overachievement represents an improvement, whereas underachievement represents a decline. However, both can be useful for diagnosis, remediation (in case of underachievement) and encouragement (in case of overachievement). Therefore, schools that pay close attention to students' learning outcomes will be able to identify students' enjoying academic success, those at risk and those that should be reinforced. Nevertheless, several factors can lead to over- and under-achievement among learners.

The implication of this paper is that teachers can use learning outcomes as guiding tools to shape their instructional strategies, curriculum design, and assessments. Aligning teaching methods with these outcomes ensures that students are progressing toward the intended goals, enhancing the overall effectiveness of education. Secondly, learning outcomes can be early indicators of students struggling to meet the expected standards. By identifying underachieving students promptly, schools can implement targeted interventions and provide the necessary support to prevent further academic setbacks. Thirdly, the concept of learning outcomes encourages educators to consider students' diverse learning styles, abilities, and backgrounds. This promotes the adoption of differentiated instruction, allowing teachers to cater to individual needs

and create a more inclusive and engaging learning environment. Fourthly, recognising and celebrating moderate or significant achievements contributes to a positive academic culture. Acknowledging students who meet or exceed learning outcomes can motivate them to maintain their efforts and inspire their peers to strive for excellence.

14. Suggestions

The following suggestions were made based on the conclusion reached in this paper.

➢ School counsellors, psychologists, and administrators should pay adequate attention to social, economic, health, psychological and environmental factors when attempting to find the roots of students' overachievement and underachievement.

➢ Educational institutions should establish a system for early identification of students falling short of learning outcomes. Collaborative efforts between school counselors, educators, and administrators can ensure tailored support and interventions that address the specific challenges faced by underachieving students.

➢ Teachers should adopt adaptable teaching strategies that consider individual learning styles, capabilities, and backgrounds. By tailoring their methods to accommodate diverse student needs, educators can foster engagement and facilitate better alignment with learning outcomes.

➢ In addition to celebrating high academic achievers, schools should also acknowledge a range of accomplishments. This recognition should extend to students making progress from their baseline or excelling in non-academic spheres like leadership and creativity. A well-rounded approach to recognition encourages a positive learning environment.

➢ Educational institutions should establish comprehensive support services that address not only academic challenges but also encompass students' emotional, social, and health-related needs. By considering a broader spectrum of factors such as mental health, socio-economic circumstances, and family dynamics, schools can create an environment conducive to overall student well-being and achievement.

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References

Adom, D., Mensah, J. A., & Dake, D. A. (2020). Test, measurement, and evaluation: Understanding and use of the concepts in education. *International Journal of Evaluation and Research in Education*, *9*(1), 109-119. https://doi.org/10.11591/ijere.v9i1.20457

Alique, D., & Linares, M. (2019). The importance of rapid and meaningful feedback on computer-aided graphic expression learning. *Education for Chemical Engineers*, *27*, 54-60. https://doi.org/10.1016/j.ece.2019.03.001

Allan, J. (1996). Learning outcomes in higher education. *Studies in Higher Education*, *21*(1), 93–108. https://doi.org/10.1080/03075079612331381487

Apriceno, M., Levy, S. R., & London, B. (2020). Mentorship during college transition predicts academic self-efficacy and sense of belonging among STEM students. *Journal of College Student Development*, *61*(5), 643-648. https://doi.org/10.1353/csd.2020.0061

Atkinson, A., Watling, C. J., & Brand, P. L. (2022). Feedback and coaching. *European Journal of Pediatrics*, *181*(2), 441-446. https://doi.org/10.1007/s00431-021-04118-8

Badger, J. R., Howarth, B. C., Svirko, E., & Mellanby, J. (2022). Underachievement at school relative to potential: links between reasoning, phonological decoding, short-term memory, and complex grammar. *Educational Psychology*, *42*(8), 952-971. https://doi.org/10.1080/01443410.2022.2115978

Bannister, N. A. (2016). Breaking the spell of differentiated instruction through equity pedagogy and teacher community. *Cultural Studies of Science Education*, *11*(2), 335–347. https://doi.org/10.1007/s11422-016-9766-0

Barrane, F. Z., Ndubisi, N. O., Kamble, S., Karuranga, G. E., & Poulin, D. (2021). Building trust in multi-stakeholder collaborations for new product development in the digital transformation era. *Benchmarking: An International Journal*, *28*(1), 205-228. https://doi.org/10.1108/BIJ-04-2020-0164

Bassey, B. A., Owan, V. J., & Agunwa, J. N. (2019). Quality assurance practices and students' performance evaluation in universities of South-South Nigeria: A structural equation modelling approach. *British Journal of Psychology Research*, *7*(3), 1–13. https://doi.org/10.5281/zenodo.4458641

Bassey, B. A., Owan, V. J., Ikwen, E. U., & Amanso, E. O. (2020). Teachers' attitudes towards learners with disability scale (TALDS): Construction and psychometric analysis. *The Journal of Social Sciences Research*, *6*(5), 518–530. https://doi.org/10.32861/jssr.65.518.530

Bondie, R. S., Dahnke, C., & Zusho, A. (2019). How does changing "one-size-fits-all" to differentiated instruction affect teaching?. *Review of Research in Education*, *43*(1), 336-362. https://doi.org/10.3102/0091732X18821130

Castejón, J. L., Gilar, R., Veas, A., & Miñano, P. (2016). Differences in learning strategies, goal orientations, and self-concept between overachieving, normal-achieving, and underachieving secondary students. *Frontiers in Psychology*, *7*, 1438. https://doi.org/10.3389/fpsyg.2016.01438

Cifrian, E., Andres, A., Galan, B., & Viguri, J. R. (2020). Integration of different assessment approaches: application to a project-based learning engineering course. *Education for Chemical Engineers*, *31*, 62-75. https://doi.org/10.1016/j.ece.2020.04.006

Cone, T. E., & Wilson, L. R. (1981). Quantifying a severe discrepancy: A critical analysis. *Learning Disability Quarterly*, *4*(4), 359–371. https://doi.org/10.2307/1510737

Cools, A., Fernández, R., & Patacchini, E. (2019). *Girls, boys, and high achievers*. (Working Paper No. w25763). Cambridge, MA: National Bureau of Economic Research. https://doi.org/10.3386/w25763

Davis, G. A., & Rimm, S. B. (1989). *Education of the gifted and talented* (2nd ed.). Englewood Cliffs, NJ: Prentice Hall. https://bit.ly/3EZ5Eft

Davis, G. A., & Rimm, S. B. (1994). *Education of the gifted and talented* (3rd ed.). Englewood Cliffs, NJ: Prentice-Hall.

De Houwer, J., Barnes-Holmes, D., & Moors, A. (2013). What is learning? On the nature and merits of a functional definition of learning. *Psychonomic Bulletin & Review*, *20*(4), 631-642. https://doi.org/10.3758/s13423-013-0386-3

Desmet, O., & Pereira, N. (2022). Gifted boys' perceptions of their academic underachievement. *Gifted Education International*, *38*(2), 229-255. https://doi.org/10.1177/02614294211050294

Ding, Y., & Zhao, T. (2020). Emotions, engagement, and self-perceived achievement in a small private online course. *Journal of Computer Assisted Learning*, *36*(4), 449-457. https://doi.org/10.1111/jcal.12410

Dings, A., & Spinath, F. M. (2021). Motivational and personality variables distinguish academic underachievers from high achievers, low achievers, and overachievers. *Social Psychology of Education*, *24*(6), 1461-1485. https://doi.org/10.1007/s11218-021-09659-2

Dings, A., & Spinath, F. M. (2021). Motivational and personality variables distinguish academic underachievers from high achievers, low achievers, and overachievers. *Social Psychology of Education*, *24*(6), 1461-1485. https://doi.org/10.1007/s11218-021-09659-2

Domjan, M. (2010). *Principles of learning and behaviour* (6th ed.). Belmont, CA: Wadsworth/Cengage. https://bit.ly/3Fj524z

Dowdall, C. B., & Colangelo, N. (1982). Underachieving gifted students: Review and implications. *Gifted Child Quarterly*, *26*, 179-184. https://doi.org/10.1177/001698628202600406

Dunlosky, J., & Rawson, K. A. (2012). Overconfidence produces underachievement: Inaccurate self-evaluations undermine students' learning and retention. *Learning and Instruction*, *22*(4), 271-280. https://doi.org/10.1016/j.learninstruc.2011.08.003

Ekpenyong, J. A., Owan, V. J., Mbon, U. F., & Undie, S. B. (2023). Family and community inputs as predictors of students' overall, cognitive, affective and psychomotor learning outcomes in secondary schools. *Journal of Pedagogical Research*, *7*(1), 103–127. https://doi.org/10.33902/JPR.202319099

Ekpenyong, J. A., Owan, V. J., Ogar, J. O., & Undie, J. A. (2022). Hierarchical linear modelling of educational outcomes in secondary schools: What matters – teachers' or administrators' input? *Cogent Education*, *9*(1), 2133491. https://doi.org/10.1080/2331186X.2022.2133491

Emerick, L. J. (1995). Academic underachievement among the gifted: Reversing school failure. In E. J. Gubbins (Ed.), *Research related to the enrichment triad model* (pp. 1-33). The National Research Center on the Gifted and Talented, University of Connecticut. https://nrcgt.uconn.edu/research-based_resources/gubbins/

Flint, A., Gaunt, J., & O'Hara, M. (2022). Supporting high-achieving students after enrolment: Learning from a qualitative evaluation of a high achievers recognition scheme. *Teaching and Learning Inquiry*, 10(3), 1-13. https://doi.org/10.20343/teachlearninqu.10.3

Forsblom, L., Pekrun, R., Loderer, K., & Peixoto, F. (2022). Cognitive appraisals, achievement emotions, and students' math achievement: A longitudinal analysis. *Journal of Educational Psychology, 114*(2), 346–367. https://doi.org/10.1037/edu0000671

Gilar-Corbi, R., Veas, A., Miñano, P., & Castejón, J. L. (2019). Differences in personal, familial, social, and school factors between underachieving and non-underachieving gifted secondary students. *Frontiers in Psychology*, 10, 2367. https://doi.org/10.3389/fpsyg.2019.02367

Halimi, F., AlShammari, I., & Navarro, C. (2021). Emotional intelligence and academic achievement in higher education. *Journal of Applied Research in Higher Education*, 13(2), 485-503. https://doi.org/10.1108/JARHE-11-2019-0286

Hamilton, D., McKechnie, J., Edgerton, E., & Wilson, C. (2021). Immersive virtual reality as a pedagogical tool in education: A systematic literature review of quantitative learning outcomes and experimental design. *Journal of Computers in Education*, 8(1), 1-32. https://doi.org/10.1007/s40692-020-00169-2

Heyder, A., Kessels, U., & Steinmayr, R. (2017). Explaining academic-track boys' underachievement in language grades: Not a lack of aptitude but students' motivational beliefs and parents' perceptions? *British Journal of Educational Psychology*, 87(2), 205-223. https://doi.org/10.1111/bjep.12145

Hochanadel, A., & Finamore, D. (2015). Fixed and growth mindset in education and how grit helps students persist in the face of adversity. *Journal of International Education Research (JIER)*, 11(1), 47-50. https://doi.org/10.19030/jier.v11i1.9099

Hussey, T., & Smith, P. (2002). The trouble with learning outcomes. *Active Learning in Higher Education*, 3(3), 220–233. https://doi.org/10.1177/1469787402003003003

Hymel, S., & Katz, J. (2019). Designing classrooms for diversity: Fostering social inclusion. *Educational Psychologist*, 54(4), 331-339. https://doi.org/10.1080/00461520.2019.1652098

Iheanacho, R. A. E. (2015). *Psychology of learning* (2nd ed). G. O. C. International Publishers

Inam, A., Nomaan, S., & Abiodullah, M. (2016). Parents' parenting styles and academic achievement of underachievers and high achievers at middle school level. *Bulletin of Education and Research*, 38(1), 57-74.

Isnain, Z. (2021). The impact of intelligence quotient on the learning outcomes of musical art in state schools. *Catharsis*, 10(2), 130-141.

Kennedy, D. (2006). *Writing and using learning outcomes: A practical guide.* Cork: University College Cork. https://cora.ucc.ie/handle/10468/1613

Koul, P., Kovela, R. K., & Kovela Sr, R. K. (2023). Handwriting evaluation in school-aged children with developmental coordination disorder: A literature review. *Cureus*, 15(3), e35817. https://doi.org/10.7759/cureus.35817

Kpolovie, P. J., Joe, A. I., & Okoto, T. (2014). Academic achievement prediction: Role of interest in learning and attitude towards school. *International Journal of Humanities Social Sciences and Education (IJHSSE)*, 1(11), 73-100.

Kuh, G. D., Kinzie, J., Buckley, J. A., Bridges, B. K., & Hayek, J. C. (2006). *What matters to student success: A review of the literature*. Washington, DC: National Postsecondary Education Cooperative. https://nces.ed.gov/npec/pdf/kuh_team_report.pdf

Kurtz, J. J., & Swenson, E. J. (1951). Factors related to over-achievement and under-achievement in school. *The School Review*, 59(8), 472-480. https://doi.org/10.1086/441844

Lachman, S. J. (1997). Learning is a process: Toward an improved definition of learning. *Journal of Psychology*, 131, 477–480. https://doi.org/10.1080/00223989709603535

Lau, K. L., & Chan, D. W. (2001). Identification of underachievers in Hong Kong: Do different methods select different underachievers? *Educational Studies*, 27(2), 187–200. https://doi.org/10.1080/03055690120050419

Lavrijsen, J., Ramos, A., & Verschueren, K. (2022). Detecting unfulfilled potential: Perceptions of underachievement by student, parents, and teachers. *The Journal of Experimental Education*, 90(4), 797-817. https://doi.org/10.1080/00220973.2020.1852523

Liu, O. L. (2011). An overview of outcomes assessment in higher education. *Educational Measurement: Issues and Practice*, 30, 2-9. https://doi.org/10.1111/j.1745-3992.2011.00206.x

McClelland, D. C. (1987). *Human motivation*. Cambridge University Press Archive. https://bit.ly/3VQAT39

Mehta, M., & Sharma, V. (2015). Stress management. In M. Mehta, & R. Sagar (Eds), *A practical Approach to Cognitive Behaviour Therapy for Adolescents* (pp. 49-178). Springer, New Delhi. https://doi.org/10.1007/978-81-322-2241-5_8

Mofield, E., & Parker, P. M. (2019). Understanding underachievement: Mind-set, perfectionism, and achievement attitudes among gifted students. *Journal for the Education of the Gifted*, 42(2), 016235321983673. https://doi.org/10.1177/0162353219836737

Montenegro, E., & Jankowski, N. A. (2020). A new decade for assessment: Embedding equity into assessment praxis. *Occasional Paper*, 42, 1-26.

Munsie, C., Ebert, J., Joske, D., & Ackland, T. (2019). The benefit of physical activity in adolescent and young adult cancer patients during and after treatment: a systematic review. *Journal of Adolescent and Young Adult Oncology*, 8(5), 512-524. https://doi.org/10.1089/jayao.2019.0013

Naidoo, K., Yuhaniak, H., Borkoski, C., Levangie, P., & Abel, Y. (2021). Networked mentoring to promote social belonging among minority physical therapist students and develop faculty cross-cultural psychological capital. *Mentoring & Tutoring: Partnership in Learning*, 29(5), 586-606. https://doi.org/10.1080/13611267.2021.1986794

Nalbone, D. P., Ashoori, M., Fasanya, B. K., Pelter, M. W., & Rengstorf, A. (2023). Salient Factors in Predicting Student Success, Including Course Modality. *International Journal for the Scholarship of Teaching and Learning*, 17(1), 11. https://doi.org/10.20429/ijsotl.2023.17111

Neuendorf, C., Jansen, M., & Kuhl, P. (2020). Competence development of high achievers within the highest track in German secondary school: Evidence for Matthew effects or compensation? *Learning and Individual Differences*, 77, 101816. https://doi.org/10.1016/j.lindif.2019.101816

Okon, A. E., Owan, V. J., & Owan, M. V. (2022). Mentorship practices and research productivity among early-career educational psychologists in universities. *Educational Process International Journal*, 11(1), 105–126. https://doi.org/10.22521/edupij.2022.111.7

Oranje, A., Mislevy, B., Bauer, M.I., Jackson, G.T. (2019). Summative game-based assessment. In: Ifenthaler, D., Kim, Y.J. (Eds), Game-based assessment revisited. advances in game-based learning. Springer, Cham. https://doi.org/10.1007/978-3-030-15569-8_3

Owan, V. J., & Ekpenyong, J. A. (2022). Usage of electronic infrastructures and students' learning effectiveness in Nigerian universities: A polytomous logistic prediction. *Ubiquitous Learning: An International Journal*, 15(2), 87–104. https://doi.org/10.18848/1835-9795/CGP/v15i02/87-104

Owan, V. J., Abang, K. B., Idika, D. O., Etta, E. O., & Bassey, B. A. (2023). Exploring the potential of artificial intelligence tools in educational measurement and assessment. *Eurasia Journal of Mathematics, Science and Technology Education*, 19(8), em2307. https://doi.org/10.29333/ejmste/13428

Owan, V. J., Ameh, E., & Anam, E. G. (2023). Collaboration and institutional culture as mediators linking mentorship and institutional support to academics' research productivity. *Educational Research for Policy and Practice*, 22(2), 1–26. https://doi.org/10.1007/s10671-023-09354-3

Owan, V. J., Ekpenyong, J. A., Chuktu, O., Asuquo, M. E., Ogar, J. O., Owan, M. V., & Okon, S. (2022). Innate ability, health, motivation, and social capital as predictors of students' cognitive, affective and psychomotor learning outcomes in secondary schools. *Frontiers in Psychology*, 13, 1024017. https://doi.org/10.3389/fpsyg.2022.1024017

Owan, V. J., Ekpenyong, J. A., Mbon, U. F., Abang, K. B., Ukpong, N. N., Sunday, M. O., Ekaette, S. O., Asuquo, M. E., Agama, V. U., Omorobi, G. O., & Undie, J. A. (2023). Predicting students' multidimensional learning outcomes in public secondary schools: The roles of school facilities, administrative expenses and curriculum. *Journal of Applied Learning & Teaching*, 6(2), 1–17. https://doi.org/10.37074/jalt.2023.6.2.9

Pardo, A., Jovanovic, J., Dawson, S., Gašević, D., & Mirriahi, N. (2019). Using learning analytics to scale the provision of personalised feedback. *British Journal of Educational Technology*, 50(1), 128-138. https://doi.org/10.1111/bjet.12592

Peterson, J.S. and Colangelo, N. (1996), Gifted Achievers and Underachievers: A Comparison of Patterns Found in School Files. *Journal of Counselling & Development*, 74, 399-407. https://doi.org/10.1002/j.1556-6676.1996.tb01886.x

Rabiner, D. L., Godwin, J., & Dodge, K. A. (2016). Predicting academic achievement and attainment: The contribution of early academic skills, attention difficulties, and social competence. *School Psychology Review*, 45(2), 250-267. https://doi.org/10.17105/SPR45-2.250-267

Rao, N. J. (2020). Outcome-based education: An outline. *Higher Education for the Future*, 7(1), 5-21. https://doi.org/10.1177/2347631119886418

Rayneri, L. J., Gerber, B. L., & Wiley, L. P. (2003). Gifted achievers and gifted underachievers: The impact of learning style preferences in the classroom. *Journal of Secondary Gifted Education*, 14(4), 197–204. https://doi.org/10.4219/jsge-2003-434

Reis, S. M., & McCoach, D. B. (2000). The underachievement of gifted students: What do we know and where do we go? *Gifted Child Quarterly*, 44(3), 152–170. https://doi.org/10.1177/001698620004400302

Reis, S. M., Hébert, T. P., Díaz, E. I., Maxfield, L. R., & Ratley, M. E. (1995). *Case studies of talented students who achieve and underachieve in an urban high school.* (Research Monograph). The National Research Center on the Gifted and Talented, University of Connecticut. https://eric.ed.gov/?id=ED414687

Robert, I. A., & Owan, V. J. (2019). Students' perception of teachers' effectiveness and learning outcomes in Mathematics and Economics in secondary schools of Cross River State, Nigeria. *International Journal of Contemporary Social Science Education (IJCSSE)*, 2(1), 157–165. https://bit.ly/2VbLzfK

Schick, H., & Phillipson, S. N. (2009). Learning motivation and performance excellence in adolescents with high intellectual potential: What really matters? *High Ability Studies,* 20(1), 15-37. https://doi.org/10.1080/13598130902879366

Schuurmans, I. K., Tamayo Martinez, N., Blok, E., Hillegers, M. H., Ikram, M. A., Luik, A. I., & Cecil, C. A. (2022). Child mental health problems as a risk factor for academic underachievement: A multi-informant, population-based study. *Acta Psychiatrica Scandinavica*, 145(6), 578-590. https://doi.org/10.1111/acps.13426

Shieh, C. J., & Yu, L. (2016). A study on information technology integrated guided discovery instruction towards students' learning achievement and learning retention. *EURASIA Journal of Mathematics, Science and Technology Education*, 12(4), 833-842. https://doi.org/10.12973/eurasia.2015.1554a

Siegle, D. L. (1995). E*ffects of teacher training in student self-efficacy on student mathematics self-efficacy and student mathematics achievement.* [Doctoral Dissertation], University of Connecticut, Storrs. https://bit.ly/3VLRF3h

Snyder, K. E., Fong, C. J., Painter, J. K., Pittard, C. M., Barr, S. M., & Patall, E. A. (2019). Interventions for academically underachieving students: A systematic review and meta-analysis. *Educational Research Review*, 28, 100294. https://doi.org/10.1016/j.edurev.2019.100294

Stone, C., & Springer, M. (2019). Interactivity, connectedness and'teacher-presence': Engaging and retaining students online. *Australian Journal of Adult Learning*, 59(2), 146-169.

Sumner, J. (2022). Overcoming stress and anxiety: Examining the impact of fixed vs growth mindsets amongst African American high achievers [Doctoral dissertation, Pepperdine University, Graduate School of Education and Psychology]. https://bit.ly/45CBqup

Tan, W. K., Sunar, M. S., & Goh, E. S. (2023). Analysis of the college underachievers' transformation via gamified learning experience. *Entertainment Computing*, 44, 100524. https://doi.org/10.1016/j.entcom.2022.100524

Tri, N. M., Hoang, P. D., & Dung, N. T. (2021). Impact of the industrial revolution 4.0 on higher education in Vietnam: challenges and opportunities. *Linguistics and Culture Review*, 5(S3), 1-15. https://doi.org/10.21744/lingcure.v5nS3.1350

Walsh, P., Owen, P. A., Mustafa, N., & Beech, R. (2020). Learning and teaching approaches promoting resilience in student nurses: An integrated review of the literature. *Nurse education in practice*, 45, 102748. https://doi.org/10.1016/j.nepr.2020.102748

Wang, J., & Rao, N. (2022). What do Chinese students say about their academic motivational goals—reasons underlying academic strivings?. *Asia Pacific Journal of Education*, 42(2), 245-259. https://doi.org/10.1080/02188791.2020.1812513

Weinstein, C. E., & Underwood, V. L. (2014). Learning strategies: The how of learning. In J. W Segal, S. F. Chipman, & R. Glaser (Eds), *Thinking and learning skills* (pp. 241-258). Routledge.

Wen, F., Zuo, B., Wu, Y., Dong, X., & Wang, W. (2016). Reducing the effect of stereotype threat: The role of coaction contexts and regulatory fit. *Social Psychology of Education*, 19(3), 607-626. https://doi.org/10.1007/s11218-016-9344-z

Whitmore, J. R. (1980). *Giftedness, conflict, and underachievement*. Boston: Allyn and Bacon. https://doi.org/10.1177/107621758300300622

Wiratna, M. Z. M. E., & Hamdiah, H. (2020). A Correlation Between Students' Intelligence Quotient (IQ) and Their Writing Ability for the Eighth Grade. *Anglophile Journal*, 1(1), 12-20. https://doi.org/10.51278/anglophile.v1i1.67

Yang, F., & Tu, M. (2020). Self-regulation of homework behaviour: Relating grade, gender, and achievement to homework management. *Educational Psychology*, 40(4), 392-408. https://doi.org/10.1080/01443410.2019.1674784

Yu, Z., Gao, M., & Wang, L. (2021). The effect of educational games on learning outcomes, student motivation, engagement and satisfaction. *Journal of Educational Computing Research*, 59(3), 522-546. https://doi.org/10.1177/0735633120969214

Zimmerman, B. J. (2023). Dimensions of academic self-regulation: A conceptual framework for education. In D. H. Schunk, & B. J. Zimmerman (Eds), *Self-regulation of learning and performance* (pp. 3-21). Routledge. https://doi.org/10.4324/9780203763353-1