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RESEARCH PAPER

Development and Validation of Lesson Plans based on Growth Mindset Activities

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ABSTRACT

This study attempts to create and validate lesson plans that feature growth mindset exercises. The idea of a growth mindset made popular by psychologist Carol Dweck. She promotes the idea that intelligence and skills can be acquired by hard work, smart maneuvers, and persistence. The lesson plans were developed to improve students' motivation, resiliency, and learning outcomes while encouraging a growth mindset among them. The study took a methodical approach, integrating both theoretical underpinnings and actual application. In order to understand the growth mindset theory, associated teaching methodologies, and existing lesson plans, a thorough assessment of the literature was first done. Using this information as a foundation, a collection of lesson plans that incorporate diverse activities like goal-setting, self-reflection, feedback, and the creation of a positive learning environment were created. Research and Development design (R&D) from Sukmadinata was used in the study. The research contributes to the field of education by providing validated lesson plans that promote the cultivation of a growth mindset. Educators can incorporate these lesson plans into their teaching practices to foster positive learning environments and support students' development of essential abilities like critical thinking, problem-solving, and resilience.

KEYWORDS Fixed Mindset, Growth Mindset Activities, Lesson Plans, Validity

Introduction

According to Ambrose et al., (2010) reasonable academic behaviour, such as reviewing test mistakes, is an essential (yet not standalone) requirement for academic performance for most students. When a student fails an exam, it is also a sign that they need to improve their behaviour. However, recognising the behavior of an individual needs to alteration isn't with sufficient frequency to bring about long-term change. According to behaviour change theory, beliefs and behaviour are inextricably related. This relationship is described as in following figure.

Figure 1. Relationship between self-beliefs, appropriate behaviour and academic success

Academic ability self-beliefs

Dweck (2006) explored the growing research on contrasting self-beliefs about academic ability: one view sees it as an unchangeable, fixed trait, while the other perceives it as a flexible and improvable trait. In a meta-analysis conducted by Burnette et al. (2013), it was revealed that individuals with growth mindsets tend to exhibit academic behaviors such as inquiring, persisting through challenging problems, and acting on constructive feedback.

Certain students who formerly excelled academically may be unable to rebound from their failure due to fixed assumptions about intelligence. Some students can explain the steps they should take to improve their academic performance, such as attending class, planning study time, asking for support when they get stuck, and working together but fail to conduct these steps despite expressing a strong desire to earn a degree and understanding that these steps are necessary to achieve this aim.

Following Table 1 shows distinctive growth and fixed attitude behaviours. Dweck summarises the first five behaviour types, which include coping with obstacles, patience, effort, recognition, and other people's achievement (2006). Learning goals, the sixth group, was a part because of its ties to learning determination (Dweck et al., 2014). Deeper learning and the ability to gain expertise in a subject are linked to growth mindsets (Farrington, 2013). Since a judgement of skill has already been made, fixed mindsets place a low value on learning from errors.

Table 1
Growth mindsets and fixed mindsets have different behaviours in category "Challenges"

Growth Mindset	Fixed Mindset
Challenges that contribute to further learning should be chosen or valued.	Avoid obstacles that could reveal your flaws.

Table 2
Growth mindsets and fixed mindsets have different behaviours in category "Persistence"

Persist in the face of adversity and demonstrate tenacity.	After a loss, it's easy to give up, become defensive, or feel powerless.

Table 3
Growth mindsets and fixed mindsets have different behaviours in category "Effort"

Make an effort in your academic work**.**	It's best not to appear to be working hard because it implies a lack of ability.

Table 4
Growth mindsets and fixed mindsets have different behaviours in category "Praise"

To give or to value.	Instead of praising commitment, give or value recognition for talent.

Table 5
Growth mindsets and fixed mindsets have different behaviours in category "Success of Others"

Others' successes will help you learn from them and empower you.	Feel threatened by other people's success.

Table 6
Growth mindsets and fixed mindsets have different behaviours in category "Learning goals"

Consider learning as a means of enhancing one's results.	Consider learning as a means of highlighting one's abilities.

Literature Review

The development and validation of lesson plans based on growth mindset activities have gained increasing attention in the field of education. This literature review aims to explore the existing research and theoretical foundations related to growth mindset, instructional strategies, and the design and effectiveness of lesson plans centered on growth mindset activities (Dweck, 2006).

The concept of growth mindset, popularized by psychologist Carol Dweck, posits that individuals who believe that intelligence and abilities can be developed through effort, effective strategies, and perseverance are more likely to achieve success. In contrast, individuals with a fixed mindset believe that intelligence and abilities are fixed traits, leading to a fear of failure and a lack of motivation to take on challenges. Numerous studies have shown how growth mindset affects motivation, resilience, and academic success (Claro et al., 2016).

To encourage pupils to adopt a growth mindset, a number of instructional practices have been suggested. These tactics include establishing a good and encouraging learning environment, encouraging effort and tenacity, teaching efficient learning techniques, and giving prompt and helpful feedback. They also involve specific training on growth mindset ideas. These methods seek to alter students' self-perceptions of their capacities and improve their metacognitive abilities (Haimovitz, 2019).

According to (Bernardo et al., 2021) thoughtful consideration of a number of aspects is necessary when creating lesson plans that are oriented on growth mindset exercises. First and foremost, lesson plans should support the goals of fostering a growth mindset, such as developing a belief in the malleability of intelligence and a positive outlook on difficulties. They should also include teaching methods that actively include students in reflective and self-control processes. To promote a growth mindset culture, class plans can incorporate exercises like goal-setting, self-reflection, group problem-solving, and the usage of growth mindset jargon.

The usefulness and validity of growth mindset lesson plans have been the subject of promising research. According to studies, students who participated in growth mindset activities and treatments showed improvements in their motivation, engagement, and academic performance.

They also demonstrated a greater willingness to persevere through challenges and embrace feedback. The use of pre- and post-intervention assessments, student surveys, and classroom observations has been instrumental in evaluating the impact of growth mindset lesson plans on students' attitudes and behaviors towards learning (Yeager & Dweck 2020).

Despite the positive findings, some challenges exist in implementing growth mindset lesson plans. One challenge involves addressing the individual differences in students' mindset beliefs and tailoring instruction to meet diverse learner needs. Another challenge is sustaining the effects of growth mindset interventions over time and transferring them to different academic domains. Future research should explore the long-term effects of growth mindset lesson plans, investigate the optimal duration and intensity of interventions, and examine the scalability of these plans across diverse educational settings (Li & Bates 2020).

Material and Methods

Research and Development design (R&D) from Sukmadinata was used in the study. There are three steps in R&D design i.e., preface study, development study, and trial. Only preface study step was used in this study. A set of lesson plans were developed based on growth mindset activities. Growth mindset activities were adapted and validated through the experts' opinion. The content was selected from the textbook of General Science for grade VIII developed by Punjab Curriculum and Textbook Board, Lahore, Pakistan – a public sector department to develop curriculum, write books, and publish them. Teaching is much more likely to be successful when guided by a clear and complete lesson plan. Lesson planning of this study covered the following components/elements of lesson plan suggested by various studies.

Learning Objectives

The first component of lesson plan for this study was objectives. This is the main component of a lesson plan because it states the target of the lesson plan. What the students will learn is stated at the beginning of lesson plan. Sahin-Taskin (2017) stated that objectives specify the skills, knowledge, awareness, and language skills a teacher wanted to develop in the students. Moore-Cox (2017) said that objectives as essential component of a lesson plan should be reasonable and attainable within the time a teacher has for lesson. Objectives of a lesson plan should be stated in behavioral term in order to know that lesson objectives have been achieved. So, objectives a important element of a lesson plan was selected for current study lesson planning.

Sequencing

Sequencing is another important component of a lesson plan. Sequencing was maintained in current study lesson planning. The events were arranged in a logical and meaningful sequence. It made lesson effective for the achievement of lesson objectives. Capp (2017) described sequencing in lesson planning as the logical and meaning time specification for certain activities. It focuses the lesson objectives to be achieved with the help of lesson activities. Maryani et al., (2017) gave a structure of sequencing in lesson planning starting with warm up then presentation of material, activities for practice, evaluation of practice, and application of such learnt activities in real situation.

Timing

Time specification is also an important element of lesson planning. Time was specified for each activity in current study lesson planning. Nagro et al., (2019) stated that each activity takes time and students should be given proper time to process activities in the class and one must not forget that learning takes time. Lesson duration and time for activities make a lesson effective for teacher to teach and student to learn. Capp (2017) focused in his study time management in lesson helps teacher to organize activities and determine what to achieve in that specific time. So, time management for different activities during lesson was ensured during the lesson planning for this study.

Differentiation

Current study lesson were planned by following the rule of differentiation. Students having different abilities and skills are in a classroom. Some students need special and individual consideration. In lesson planning differentiation helps a teacher to have flexibility for special need students. Sahin-Taskin (2017) state that lesson should be planned according to differentiation rule. It creates learning environment and make classroom as interesting place of learning. Students take interest in learning and participate in lesson actively. So, in present study lesson planning, the rule of differentiation was ensured to make the lesson effective for both normal students and special need students.

Assessment

Current study lessons were embedded with the component of assessment to know the status of the achievement of lesson objectives. Black et al., (2019) suggested that there should be assessment at during and at the end of a lesson to know the status of students' learning and achievement of lesson objectives. It also helps teacher to know his/her success in lesson teaching. Maryani et al., (2017) stated that there were different techniques for classroom assessment. Students may be asked for presentation in the class. Teacher may arrange drills, and short quiz or written assignment. Teacher may organize group or individual activities in the class to assess students' learning. Assessment was placed in present study lesson planning also.

Learning Materials

Material selection as component of lesson plan was considered in the present study lesson planning. Maryani et al., (2017) write that materials like books, handouts, charts, cards and so on are ensure effective teaching in class. Teacher becomes confident to achieve lesson objectives because he/she is before time prepared for that. Moore-Cox (2017) also stated the importance of material selection for the achievement of lesson objectives. For present study, charts, white board, books, handouts, and models were arranged for teaching the general science subject.

The purpose of the intended lesson planning to target the objectives that circle around growth mindset. The lesson plans given in this study focus on generating the growth mindset among the General Science students in Pakistani schools by carefully nurturing each lesson plan at each stage in the given aspects of pre, during and post-planning stages of the lessons.

All the lesson plans follow the general planning principles. However, a clear distinction between the lesson plans generated previously for growth mindset and those in the present study is the fact that this study has embedded the brainology curriculum and the elements of behaviorism, constructivism, communities of practice & connectivism in the light of the literature available and the data collected through interviews and focus group discussions in respect of the study environment of Pakistani schools together with the above-mentioned general principles of lesson planning to test the extent to which growth mindset activities embedded in the lesson plan affect the students' motivation to learn, mindset beliefs about intelligence and achievement in the subject of General Science.

Validation of Lesson Plans. The lessons were validated by the four experts. Two of them had expertise in the field of (STEM) Education and two were elementary school teachers. The experts were requested to validate the lesson plans in accordance with the check list developed by the researcher under the supervision of the worthy supervisor. Their expert opinions showed that the lessons were valid for teaching General Science subject at grade VIII. However, some grammatical, content selection and vocabulary suggestions were given. In the light of their suggestions grammatical corrections were incorporated and vocabulary was made easy. The content was also minimized according to the suggestions of the experts.

To ensure the validity of lesson plans, tryout of lesson plan was also done in a public school based in district Lahore, Pakistan. Tryout helped the researcher to make lesson plans more valid for teaching General Science subject at grade VIII by selecting content for the achievement of the stated objectives, making assessment and homework section more comprehensive for the students. The lesson planning consisted of three sessions; every session consisted of 3 x 45 minutes. These three sessions were observed by 35 students of Grade VIII and three elementary science teachers of that school. Validation lesson planning was an expert assessment by three elementary teachers. A guideline was given to the

teachers to validate the lesson plans. The guideline helped the teachers to evaluate lesson plans in the following aspects. These were identity of lesson plans. The process includes developing indicators, defining learning objectives, choosing teaching and learning materials, selecting appropriate sources, media, and tools, designing learning activities, and implementing assessment methods.

Summary of experts' opinions and changes incorporated is viewed in table 3.1.

Table 7
Summary of Lesson Plans Validation

No	Elements of Lesson Plans	Expert reviews/suggestions	Suggestions incorporated
01	Identity of lesson plan	The indicators for the identity of lesson plan encompass the inclusi of comprehensive information abo the subject, topic, student lev number of students, and tir allocation. The lesson plan's identi is considered valid when it fulfi these criteria, indicating that contains all the essent components. Methodology should also be part of identity of lesson plans.	Methodology has been added in identity of lesson plans.
02	Formulation of indicators	The indicators for the Formulation of Indicators include their alignment with knowledge, understanding, application, motivation, and mindset. As per expert opinions, these aspects of indicators are considered valid. Lesson plans are using the appropriate verbs to measure indicators. The verbs to measure the higher level of thinking are missing.	The verbs to measure the higher level of thinking are missing as the present study was limited to measure the lower level of thinking i.e., knowledge, understanding and application of Bloom Taxonomy of educational objectives.
03	Selection of learning objectives	Indicator of the Learning Objectives are from the National Curriculum for general science: grades IV-VIII 2006. The evaluation conducted by experts confirmed the validity of the indicators' formulation. This indicates that the process and expected learning outcomes align with the benchmarks and standards.	
04	Selection of teaching materials	The Selection of Teaching Materials indicator involves ensuring the alignment of teaching materials with learning objectives and time allocations. Experts have evaluated this aspect and found the selection of teaching materials to be valid. It indicates the suitability between the teaching materials, learning objectives, and time allocation. However, some videos in the	All the videos and animations related with content are downloaded and used from the official website of e-learn Punjab, Pakistan in the lesson plans.

		selection of teaching materials do not completely align with the learning objectives, even though they are included. An animations related with content should only be downloaded and used from the official website of e-learn Punjab, Pakistan.	
05	Selection of sources, media and learning tools	The indicator for the Selection Sources, Media, and Learning Too evaluates the appropriateness of t chosen sources, media, and learni tools. Experts have assessed a confirmed the validity of t selection in this aspect. Additional the experts recommend that t planning of resources, media, a learning tools should be aligned wi the National Curriculum for gene science: grades IV-VIII 2006 and incorporated into the lesson plan.	The resources, media, a learning tools utilized in t lesson plans align with t National Curriculum f general science: grades IV-V 2006.
06	Learning activities	Indicators of learning activities are accordance with the learning objectives and scientific approach. The learning activities have been evaluated and deemed valid by the experts. Furthermore, the experts recommend that these activities should provide students with opportunities to observe, ask questions, gather information, make connections, and communicate. Additionally, the experts emphasized that the learning activities presented in the lesson plans should also be designed to foster critical thinking and problem-solving skills. increase motivational level of students and change their mindset from fixed to growth. So more relevant videos regarding motivation and mindset should be added	The learning activities give students the opportunity to observe, ask questions, gather information, associate and communicate. In addition, the learning activities presented in the lesson plans are able to increase motivational level of students and change their mindset from fixed to growth. So more relevant videos regarding motivation and mindset have been added in the lesson plans.
07	Assessment	The Assessment indicator compris three components: alignment of t assessment with all aspec adherence to the indicator, a appropriateness of answer ke scoring guidelines, and conte Experts have confirmed the validi of this aspect of assessment. Th further recommended that t assessment section of lesson pla should encompass all aspects assessment (cognitive, affective, a psychomotor), in line with t assessment indicators, and shou	The assessment part of lesson used two aspect of assessment (cognitive and affective), in accordance with the assessment indicators and assessment in accordance with the scores and answer keys.

	align with the scoring and answ keys.

Note. Based on table 7 the results of the review and advice of experts carried out improvements in lesson plans mainly on aspects of teaching materials, learning activities, assessment and learning tools.

Discussion

The development and validation of lesson plans based on growth mindset activities holds significant potential for enhancing students' attitudes, motivation, and academic achievement. This discussion will explore the key findings and implications of research in this area, as well as address limitations and suggest future directions for investigation (Yeager et al., 2019).

The implementation of growth mindset lesson plans has shown positive effects on students' attitudes and beliefs about their abilities. Research findings indicate that students exposed to growth mindset activities exhibit increased self-belief, a greater willingness to embrace challenges, and a more positive outlook on the value of effort and perseverance. A more robust and driven attitude to learning may result from these changes in thinking (Sarrasin et al., 2018).

It has been discovered that growth mindset exercises implemented into lesson plans have a favorable impact on students' motivation and involvement in the learning process. Students are more likely to see difficulties as chances for improvement if educators encourage the idea that intelligence and skills can be developed. This change in perspective promotes engagement, goal-setting, and a readiness to look for and use efficient learning techniques. Studies have shown that growth mindset exercises and students' academic achievement are positively correlated. Growth mindset lesson plans frequently result in students performing better across a range of academic subjects. Students are more likely to persevere through challenges, ask for assistance when necessary, and regard mistakes as teaching opportunities when they have faith in their ability to progress. Their general academic performance and results consequently increase (Savides & Bond, 2021).

Teachers and the general classroom environment will be affected by the use of growth mindset lesson plans. By highlighting the importance of effort, offering helpful criticism, and encouraging a culture of continual progress, educators play a crucial role in fostering a supportive and growth-oriented environment. Teachers can build strong bonds with their students, increase their sense of self-efficacy, and produce a climate that encourages learning and personal growth by adding growth mindset exercises into their lesson plans (Campbell et al., 2021).

Several restrictions should be taken into account, despite the positive outcomes of research on the creation and validation of growth mindset lesson plans. First off, the majority of research has concentrated on short-term interventions; the long-term impacts of these lesson plans are less well known. Future studies should investigate how long-lasting the effects of a growth mindset are and how to best reinforce their principles as students' progress through their academic careers. Additionally, research is required to examine the applicability of growth mindset techniques in many academic fields and real-world situations (Fraser, 2018).

Conclusion

It is concluded that the lesson plans based on growth mindset activities developed and validated can be used for teaching General Science at elementary school level. These growth mindset activities may be beneficial to enhance students' motivation to learn general science and their achievement at elementary level.

Recommendations

Growth mindset exercises should be included in educational institutions' and curriculum creators' curricula. This can be accomplished by including particular classes or modules devoted to imparting growth mindset concepts and techniques. Teachers can continuously emphasize the value of effort, perseverance, and the conviction in the possibility of growth by integrating growth mindset exercises throughout the curriculum.

In order to successfully execute growth mindset lesson plans, teachers are essential. Because of this, it is crucial to offer professional development opportunities that give teachers the information and abilities they need to include growth mindset exercises into their teaching methods. Understanding growth mindset theory, teaching techniques, developing a positive classroom climate, and successfully executing growth mindset lesson plans should be the main areas of professional development.

The development of forums and chances for educators to interact and exchange knowledge about growth mindset lesson ideas can be helpful. This can be done through professional learning communities, online discussion boards, or workshops where educators can talk about problems, share effective tactics, and gain insight from one another's experiences. Such collaborative settings can improve the efficacy and refining of educational programs promoting growth mindset.

Setting up suitable assessment procedures is essential to gauging the success of growth mindset lesson programs. Both qualitative and quantitative techniques, such as surveys, observations, interviews, and evaluations of academic performance, can be used in this. Monitoring students' growth attitude development on a regular basis can give teachers useful feedback and point out areas where lesson plans need to be improved.

It is crucial to acknowledge that students start from diverse places in terms of their thinking beliefs and learning preferences. Growth mindset-based lesson plans should be flexible and responsive to the various learning styles of the pupils. Differentiated instruction, scaffolded support for struggling students, and offering extensions to advanced students should all be taken into account. It is possible to guarantee that growth mindset lesson plans are inclusive and advantageous for all students by using individualized strategies.

Although previous research has shed light on the immediate benefits of growth mindset lesson plans, longitudinal studies can provide a more thorough knowledge of the long-term effect. In order to analyze the sustainability of growth mindset effects and investigate the link between growth mindset and long-term academic success, professional achievements, and general well-being, longitudinal research can monitor students' mentality development over an extended period of time. Growth mindset lesson plans can be developed and validated more effectively through collaboration between educators, researchers, and subject matter experts.

Collaboration can involve partnering with researchers to design rigorous studies, seeking expert guidance in lesson plan development, and staying updated with the latest research and evidence-based practices. By fostering these collaborations, educators can leverage the expertise of the research community to continually improve growth mindset lesson plans.

In conclusion, the development and validation of lesson plans based on growth mindset activities hold immense potential to enhance students' attitudes, motivation, and academic achievement. By implementing the recommendations mentioned above, educational institutions and educators can effectively integrate growth mindset principles into their teaching practices, creating a positive and empowering learning environment that nurtures students' growth mindset development.

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