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# Game-Changer Using Dick and Carey Model in Enhancing Academic Achievement through Effective Instructional Strategies

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## *Abstrak*

*Berdasarkan hasil wawancara dan observasi yang telah dilakukan di sekolah menunjukkan bahwa hasil belajar kognitif IPA siswa kelas V SD masih rendah. Penelitian ini bertujuan untuk menganalisis pengaruh yang signifikan model pembelajaran discovery learning berbantuan media mind mapping terhadap hasil belajar kognitif IPA siswa kelas V Sekolah Dasar. Penelitian ini meggunakan desain quasy experimental design dengan rancangan non-equivalent control group design. Populasi penelitian sebanyak 186 siswa, penentuan sampel akan diacak, dan kelas eksperimen dan kontrol akan diberikan pretest kemudian disetarakan dengan uji anava. Metode pengumpulan data dalam penelitian ini adalah metode tes, yakni tes objektif. Teknik analisis data dalam penelitian ini ada dua yakni analisis statistika deskriptif dan analisis statistika inferensial. Diketahui nilai $t_{hitung}$ sebesar 24,448 lebih besar dari $t_{tabel}$ sebesar 1.681, nilai ini menunjukkan bahwa terdapat pengaruh yang signifikan model pembelajaran discovery learning berbantuan media mind mapping terhadap hasil belajar kognitif IPA siswa kelas V Sekolah Dasar. Implikasi dari penelitian ini secara praktis dapat digunakan oleh guru sebagai acuan dalam meningkatkan hasil belajar siswa.*

**Kata Kunci:** Model Dick and Carey, Strategi Pembelajaran, Prestasi Akademik

## Abstract

Based on the results of interviews and observations carried out at school, it shows that the cognitive science learning outcomes of fifth grade elementary school students are still low. This research aims to analyze the significant influence of the discovery learning learning model assisted by mind mapping media on the cognitive science learning outcomes of fifth grade elementary school students. This research uses a quasi-experimental design with a non-equivalent control group design. The research population is 186 students, the sample determination will be random, and the experimental and control classes will be given a pretest and then equalized using the ANOVA test. The data collection method in this research is a test method, namely an objective test. There are two data analysis techniques in this research, namely descriptive statistical analysis and inferential statistical analysis. It is known that the t-calculated value of 24.448 is greater than the t-table of 1,681. This value shows that there is a significant influence of the discovery learning model assisted by mind mapping media on the cognitive science learning outcomes of fifth grade elementary school students. The practical implications of this research can be used by teachers as a reference in improving student learning outcomes.

**Keywords:** Dick and Carey Model, Instructional Strategies, Academic Achievement

## 1. INTRODUCTION

One approach that has gained significant recognition is the implementation of the Dick and Carey Model. The Dick and Carey Model is a widely recognized instructional design model that provides a step-by-step process for designing effective instruction. Developed by Walter Dick and Lou Carey, this model has been extensively used in various educational settings and has yielded remarkable results. This model provides a structured framework for designing instructional materials and has proven to be instrumental in

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achieving desired learning outcomes. The model is a systematic approach used in instructional design that focuses on learner-centered instruction. It emphasizes the importance of identifying instructional goals, analyzing the needs of the learners, and designing instruction that aligns with these goals and needs. Implementing the Dick and Carey Model has shown promising results in enhancing academic achievement across various educational settings. By carefully analyzing the needs and characteristics of learners, educators can design instruction that caters to individual learning styles and preferences. This personalized approach to teaching can greatly impact student engagement and motivation, leading to improved academic outcomes. A systematic approach to instructional design ensures that educators create instructional materials and strategies that are aligned with the learning objectives and meet the needs of the learners. This systematic approach not only enhances the quality of instruction but also promotes consistency and efficiency. By following a structured process, educators can effectively identify learning goals, analyze the learners' needs, design appropriate instructional materials, implement them in the classroom, and evaluate their effectiveness. A crucial component of the Dick and Carey Model is the selection and implementation of effective instructional strategies.

To enhance academic achievement, educators must employ effective instructional strategies that cater to the diverse needs of students. The model emphasizes the importance of understanding the characteristics and needs of the learners before designing the instruction. This learner-centric approach ensures that the instructional strategies are aligned with the students' abilities, interests, and learning styles, thereby increasing their engagement and motivation to learn. The effectiveness of this model in improving reading comprehension skills among elementary school students (Kim et al., 2021; Smith et al., 2021). The researchers found that students who received instruction based on the Dick and Carey Model showed significant improvement in their reading comprehension compared to those who received traditional instruction methods. Another study explored the use of the Dick and Carey Model in enhancing mathematical problem-solving skills among middle school students (Manurung et al., 2020; Telaumbanua et al., 2017). The results revealed that students who were taught using this model demonstrated higher levels of problem-solving abilities and achieved better academic performance in mathematics. These studies highlight the importance of employing effective instructional strategies such as the Dick and Carey Model, to enhance academic achievement. By using this model, educators can design instruction that is tailored to the individual needs of their students, thereby promoting a more personalized and engaging learning experience.

The use of this model, along with other instructional strategies, can contribute to a more personalized and engaging learning experience, ultimately leading to improved academic performance among students. Recent research has highlighted several strategies that align with the principles of the model and have proven to be successful in enhancing academic achievement. Active learning techniques, such as group discussions, hands-on activities and problem-solving exercises encourage students to actively engage with the learning material. These strategies promote critical thinking, collaboration and a deeper understanding of the subject matter, ultimately leading to improved academic performance (Freeman et al., 2014; Yang & Wu, 2012).

Recent studies have shown that incorporating educational technologies, such as online simulations, virtual reality and interactive multimedia can significantly enhance student engagement and knowledge retention (Childs et al., 2023; Powers et al., 2020). Formative assessment strategies, such as quizzes, exit tickets and peer feedback, provide ongoing feedback to both students and teachers. These strategies help identify areas of improvement, adjust instruction accordingly, and ultimately enhance student learning (Orlich et al., 2009; Shannon & & Bylsma, 2007). Differentiated instruction aims to meet the diverse learning

needs of students by tailoring instruction based on individual abilities, interests, and learning styles. Recent research suggests that implementing differentiated instruction strategies can lead to improved academic achievement and increased student satisfaction (Tomlinson et al., 2003).

## 2. METHOD

The Dick and Carey model is a systematic approach to instructional design that involves analyzing instructional goals, identifying instructional strategies, designing and developing instructional materials and evaluating the effectiveness of the instruction. The researcher explores how the Dick and Carey model can be applied in various educational settings to improve academic achievement by using evidence-based instructional strategies. The research conducted a thorough literature review to gather existing knowledge and theories related to instructional strategies and the Dick and Carey Model. The comprehensive investigation of the topic provided valuable insights into the use of the Dick and Carey model in improving academic achievement.

## 3. RESULT AND DISCUSSION

### Result

The Dick and Carey Model Core Element

Dick and Carey's instructional model, as depicted in the Figure below is composed of nine elements, each exerting a significant influence over the others, as described at Figure 1.

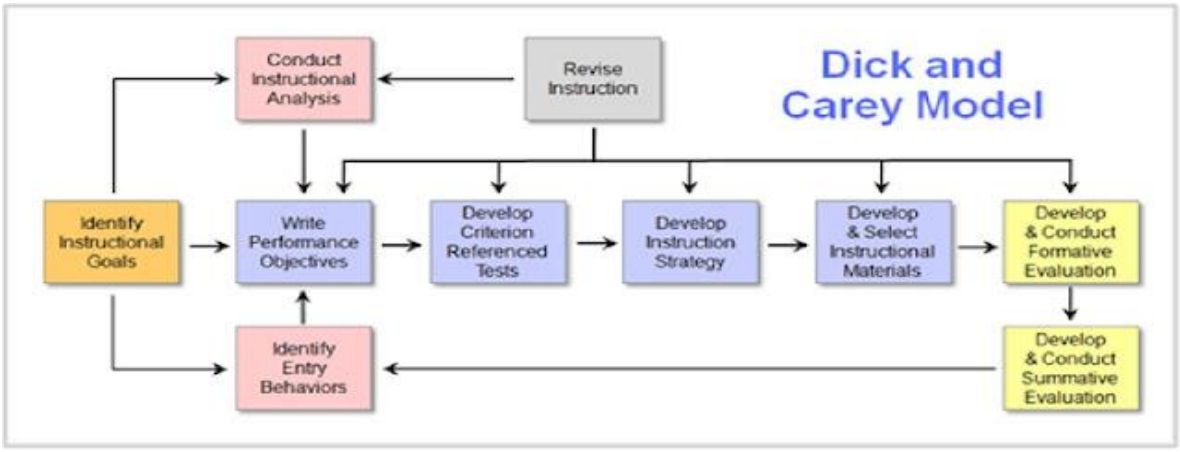


**Figure 1.** Dick and Carey's Instructional Model

Identify Instructional Goals

The first step in the Dick and Carey's Model is to clearly define the instructional goals. These goals serve as a roadmap for the entire instructional design process. By clearly articulating the goals, designers can align the instructional materials to meet specific learning objectives. The setting clear instructional goals helps educators align their teaching strategies with the desired learning outcomes, resulting in more effective instruction (Bell & Bell, 2020). A completed goal statement should include (a) the learners, (b) what the learners will be able to do in the performance context, (c) the performance context in which the skills will be applied, and (d) the tools that will be available to the learners in the performance context (Darling-Hammond & Snyder, 2000; Marzano et al., 1993). Revisions for instructional goals will need to be made until each component is included in the instructional goals.

Conduct Instructional Analysis

Once the instructional goals are established, the next step is to conduct an instructional analysis. This involves breaking down the desired outcomes into smaller, manageable units. The analysis focuses on identifying the prerequisite knowledge and skills required for effective learning. By conducting a thorough analysis, designers can structure the instructional materials logically and sequentially. The importance of instructional analysis in ensuring the coherence and effectiveness of instructional design (Seidel & Shavelson, 2007). As highlighted, conducting a thorough instructional analysis ensures that the instructional materials are tailored to the specific needs of the learners, leading to improved learning outcomes (Morrison et al., 2006).

Write Performance Objectives

Performance objectives clearly describe the task or process that must be mastered, as well as the criteria that you are going to gauge learner progress. The performance objectives must also include the specific conditions in which the task or skill will be carried out, such as observing your audience on the job or in a particular real-world setting. A performance objective should be written into three parts: (a) conditions (b) behaviour and (c) criteria. Conditions describe the skill with the tools and resources needed to achieve the skill (Konczak et al., 2011). Behavior describes the skill such as actions, content or concepts. Criteria describe the acceptable performance of the skill. The objectives also function as measuring tools that connect to the assessment step and must be considered the foundational step to the next stage of testing. The need for clear and measurable performance objectives to facilitate effective instructional design and assessment (Khalil & Elkhider, 2016).

Identify Entry Behavior

Entry behaviour refers to the existing knowledge, skills, attitudes, and experiences that learners possess before beginning a new instructional program. Identifying entry behaviour involves conducting a thorough analysis of learners' characteristics and abilities. According to the Dick and Carey Model, effective instruction requires a clear understanding of learners' entry behaviours. By assessing their prior knowledge and skills, tailoring the instruction to meet learners' specific needs and building upon what they already know. The goal is to gather information about learners' strengths, weaknesses, interests and learning styles. This approach helps to activate learners' existing schemas, making new information easier to understand and retain. Regular assessments and feedback allow educators to monitor learners' progress and make necessary adjustments to the instruction. This approach promotes engagement, activates prior knowledge, and fosters a supportive learning environment. Incorporating entry behaviour analysis in instructional design has been shown to improve academic outcomes and contribute to learners' overall success.

Develop Criterion-Referenced Tests

Criterion-referenced tests (CRTs) are assessments that measure a student's performance against a set of predetermined criteria or standards. These tests are widely used in education to evaluate students' mastery of specific skills or knowledge. The Dick and Carey Model is a systematic instructional design model that provides a framework for developing effective CRTs. The first step in developing a CRT using the Dick and Carey Model is to identify the instructional goals or objectives. Once the goals are established, the next step is to conduct a task analysis. This involves breaking down the instructional goals into smaller, more manageable tasks. Develop test specifications determining the format of the test (e.g., multiple choice, short answer), the number of items, and the difficulty level of the items. Test specifications ensure that the test aligns with the instructional goals and

accurately measures the desired knowledge. Various item formats can be used such as multiple choice, true/false or matching items. It is important to ensure that the items are unbiased and free from any potential sources of confusion. The test should be carefully reviewed for any errors or inconsistencies before it is administered to students. These tests play a crucial role in evaluating student performance and informing instructional decision-making.

Develop Instructional Strategy

The four major components consisting of pre-instructional activities, content presentation, learner participation (including feedback) and follow-through activities make up the instructional strategy component. Instructional strategies must focus on memory and transfer skills. This involves selecting the most effective methods, techniques and media to deliver the content to learners, the nature of the content and the available resources. Incorporating multimedia principles such as the use of visuals and interactive elements, enhances learner engagement and improves knowledge acquisition (Cairncross & Mannion, 2001; Kirschner et al., 2011). Thus, careful selection of instructional strategies is crucial for creating impactful learning experiences.

Develop and Select Instructional Materials

Developing and selecting instructional materials involves creating or choosing resources that align with the instructional strategy and meet the intended learning objectives. Depending on lessons taught and available supporting resources, instructional materials function as important resources for knowledge and skills. Learners are required to engage actively with the instructional material. By the end of this phase, the designer should have draft copies of materials, assessments and instructor manuals. The designer can continue revising and improving lesson materials during the evaluation process. The importance of utilizing a variety of instructional materials, including textbooks, multimedia resources and online platforms, to cater to diverse learner preferences and optimize learning experiences (Afacan Adanır et al., 2020; Moore & G.Anderson, 2003).

Develop and Conduct Formative Evaluation

Formative evaluation is the collection of data and information during instruction that can be used to look at the effectiveness of instruction (Bennett, 2011). Formative evaluation should be conducted within the instruction and happening as instruction is taking place. However, formative evaluations may not always take place in non-formal instruction. Formative evaluations can be completed in many ways such as Questioning content, Observations of learners, Record analysis, Interviews, Self-assessments, Short quizzes and Discussion. Also, formative evaluation involves gathering feedback from learners and experts during the instructional design process to identify areas for improvement. The value of formative evaluation in identifying potential design flaws, validating instructional materials and making necessary revisions to enhance instructional effectiveness (Akomaning, 2019; Oktarina et al., 2022). Formative evaluation using the Dick and Carey Model has several benefits in enhancing academic achievement. It allows educators to identify and address instructional gaps, ensuring that the learning objectives are met. Through the analysis of learners and context, educators can tailor their instructional strategies to meet the specific needs of the students. Additionally, the iterative process of revising materials based on feedback ensures continuous improvement and effectiveness. This comprehensive approach provides a holistic view of instructional effectiveness and allows for informed decision-making. The data collected should be analyzed thoroughly to identify strengths and weaknesses and inform instructional revisions.

Develop and Conduct Summative Evaluation

Summative evaluation is a collection of data that looks at the effectiveness of instruction as a whole (Dick et al., 1996). Summative evaluation measures an entire unit of instruction and multiple performance objectives. When developing the summative evaluation, the objectives must match the summative evaluation. Summative evaluations differ from formative evaluations. The main difference is the purpose of conducting an evaluation. Formative evaluations identify improvements needed during instruction, whereas summative evaluations identify strengths and improvements after instruction. These objectives should be specific, measurable, achievable, relevant and time-bound (SMART). Defining clear objectives helps in determining the criteria for evaluating the program's success. The next step is to develop appropriate assessment instruments or tools to measure the achievement of the learning objectives. These assessment tools can include tests, quizzes, assignments, or projects that align with the desired outcomes. It is important to ensure that the assessment instruments are valid and reliable, meaning they accurately measure what they are intended to measure and produce consistent results. Once the assessment instruments are developed, the next step is to administer them to the learners who have completed the instructional program. The results of these assessments provide valuable data for evaluating the effectiveness of the program. It is important to analyze the data and interpret the results objectively to gain insights into the strengths and weaknesses of the program. These findings can guide instructional designers and educators in making necessary revisions to the program to enhance its effectiveness. Finally, the last step in the Dick and Carey model is to report the findings of the summative evaluation. This includes sharing the results with relevant stakeholders such as educators, administrators and policymakers. Reporting the findings helps foster accountability and transparency in the educational system and enables stakeholders to make informed decisions about the effectiveness of the program. Summative evaluations using this model can contribute to the continuous improvement of educational practices and ultimately lead to improved academic achievement.

Revise Instruction

Based on the feedback received during formative evaluation, the instructional materials are revised to address any identified issues or shortcomings. This stage involves delivering the instruction and monitoring the learners' progress. Designers must be prepared to make necessary revisions based on feedback and evaluation. As highlighted, the implementation and revision stage allows for continuous improvement and ensures that the instructional materials meet the needs of the learners (Fradd et al., 2001; Naqsyabandiyah & Dehghanitafti, 2023). The iterative nature of the instructional design process allows for continuous improvement and refinement of instructional materials, ultimately leading to enhanced learning outcomes (Tjeerd & Nienke, 2013).

Dick and Carey Model Effective Instructional Strategies Strengths

The model emphasizes the importance of analyzing learner characteristics, needs and goals. This learner-centred approach ensures that the instructional strategies are tailored to meet the specific needs and preferences of the target audience. The model emphasizes the identification and formulation of clear and measurable instructional objectives. This ensures that the instructional strategies align with the desired learning outcomes, making it easier to assess and evaluate the effectiveness of the instruction. The model encourages collaboration among instructional designers, subject matter experts, and other stakeholders. This collaborative approach facilitates knowledge sharing, brainstorming, and the integration of diverse perspectives, leading to more effective instructional strategies. The Dick and Carey

Model allows for flexibility in instructional design. Designers can adapt and modify the strategies based on the unique requirements of the learning context, the available resources, and the characteristics of the learners. The model is grounded in research and instructional design principles, ensuring that the instructional strategies are based on sound pedagogical principles and best practices.

Weaknesses

The Dick and Carey Model involves a detailed and time-consuming process, which may not be feasible in situations where there are tight timelines or limited resources. The extensive analysis, design and development stages can be challenging to implement in practice, especially for smaller-scale instructional projects. The model uses technical terminology and concepts that may be unfamiliar to instructional designers who are new to the field. This can create a learning curve and may require additional training and support for designers to fully understand and apply the model effectively. The original model does not explicitly address the integration of digital tools and online learning environments which are increasingly important in modern instructional design.

Opportunities

The Dick and Carey Model can be adapted to incorporate technology and leverage the benefits of online learning platforms, multimedia resources and interactive tools. This presents an opportunity to enhance the effectiveness and engagement of instructional strategies in the digital age. The model's focus on learner needs and objectives provides an opportunity to customize and personalize instruction. By leveraging technologies such as adaptive learning systems, instructional designers can create tailored learning experiences that cater to individual learner preferences and abilities. The model can be extended to address accessibility and inclusivity considerations. By incorporating universal design for learning principles, instructional designers can ensure that the instructional strategies accommodate the needs of learners with disabilities, diverse backgrounds and different learning styles.

## Discussion

The Importance of Thoroughly Analyzing Learner Needs and Objectives Before Designing Instruction

That thoroughly analyzing learners' needs and objectives is essential before designing instruction using the Dick and Carey Instructional Design Model (Dikmen, 2019; Lewis, 2023). Here are the reasons why this analysis is so important. Ensure specific and measurable learning objectives: By analyzing learners' needs and goals, instructional designers can determine specific and measurable learning objectives. This will help ensure that learners acquire the desired knowledge and skills. Determine effective learning strategies: By understanding learners' characteristics, instructional designers can determine effective learning strategies. The right learning strategy will help learners understand the material better. Selecting appropriate learning materials: By understanding learners' needs and objectives, instructional designers can select appropriate learning materials. Appropriate learning materials will help learners understand the material better. Improving evaluation effectiveness: By understanding learners' needs and objectives, instructional designers can design effective evaluations. Appropriate evaluation will help ensure that learners acquire the desired knowledge and skills.

The Process of Identifying Learner Characteristics, Entry Behaviours and Desired Outcomes

The process of identifying learner characteristics, initial behaviours and desired outcomes is an important stage in the Dick and Carey Instructional Design Model. The following are the steps in the identification process (Barzegar et al., 2016). Analyze learner characteristics: Analyze learner characteristics to find out the characteristics of students who will learn. This can help learning program designers in selecting and developing learning programs that are appropriate to the characteristics of the learners. Identify initial behaviour: Determining learners' initial knowledge, skills and attitudes. Identifying these initial behaviours can help instructional designers in determining specific and measurable learning objectives. Identify desired outcomes: Determine the desired learning outcomes. This will help instructional designers in determining effective learning strategies and selecting appropriate learning materials.

By conducting a thorough process of identifying learner characteristics, initial behaviours and desired outcomes, instructional designers can design learning programs that match the needs and characteristics of learners. This will help ensure that learners acquire the desired knowledge and skills.

Examples of How this Analysis can Inform the Design of Effective Instructional Strategies

The Dick and Carey Model Learning Design in Islamic Religious Education Subjects (Nugraha et al., 2024; Setiadi et al., 2022). The study explores the Dick and Carey learning design in learning Islamic Religious Education. A good learning process will give birth to quality students. The achievement of learning objectives is obtained through the use of appropriate and effective learning designs. This research is descriptive qualitative. The results showed that the implementation of this model systematically and thoroughly can improve students' career maturity. The results of the study indicate that the Dick and Carey learning design is very appropriate to be used in the learning process that is oriented towards the skills of students. The researcher explored effective learning models in the Indonesian Language and Literature subject. The results show that the Dick and Carey learning model can be used to design effective Indonesian Language and Literature learning activities. The quality of the process and learning outcome always gathers side by side and is proportional. The qualified learning process will produce a qualified learning outcome. The indicator of the learning process is emerging by using the correct learning model to support the learning outcome.

The Application of Dick and Carey's Instructional Design Model in Mathematics Learning (Faryadi, 2012; Purnamasari et al., 2019). The study aimed to evaluate students' mathematics learning outcomes through the implementation of the Dick and Carey model. The results showed that the implementation of this model systematically and thoroughly can improve student learning outcomes. Students are required to master a variety of skills. Only with a good learning experience and a conducive learning atmosphere will it be easier for students to gain the skills needed in future competitions. For this reason, every teacher is required to present all the needs of students so that learning objectives can be adequately achieved. Dick and Carey include cognitive and behavioristic elements that emphasize the student's response to the stimulus presented. The implementation of this learning system design model requires a comprehensive systematic process. It is necessary to create a learning system design that can be used optimally in overcoming learning problems.

Case Studies on Successful Implementation of the Dick and Carey Model

The Dick and Care model helps teachers to analyze learning needs. By understanding students' characteristics, their initial understanding, as well as the challenges they may face in the material, teachers can design learning that suits students' needs. Teachers can design a logical sequence of learning, paying attention to the gradual understanding of concepts and

increasing the complexity of the material. Through organized steps, teachers can devise effective learning strategies, such as the use of case examples, problem-based activities, simulations and group discussions.

Based on the results of observations made in class IV SDN Bandulan 5 Malang on social studies learning activities and interviews with class IV teachers SDN Bandulan 5 Malang, some of the problems in social studies learning including students tend to be passive when learning takes place the ability of students in memorizing is still relatively low student attention to the material is still lacking. The results showed that the application of the Dick and Carey model from the implementation of Cycle I and Cycle II can improve the activity and learning outcomes of social studies fourth-grade students SDN Bandulan 5 Sukun District Malang City. The average acquisition of student activity increased from the average value of student activity in Cycle I by 17% and in Cycle II student activity increased by 68%. The average acquisition of student learning outcomes increased from the average pre-action score of 62% in the implementation of Cycle I to 39% and in Cycle II student learning outcomes increased by 55%. It was concluded that the application of the Dick and Carey learning model can improve the activities and learning outcomes of fourth-grade social studies students in SDN Bandulan 5 Sukun District Malang City. It was recommended that teachers can use variations in learning that are effective efficient and interesting and can apply the Dick and Carey learning model to other materials or fields of study.

Dick and Carey's learning model is very appropriate when applied to teaching the Indonesian language and literature (Aji, 2016). This is because the Dick and Carey learning model refers to the general stages learning development system, so this model is appropriate to be applied in skill-based subjects. In addition to this, the Dick and Carey model has 10 systematic learning steps from identifying the general from identifying general learning objectives to conducting evaluation. Moreover, Dick and Carey's model has ten steps in the systematical learning process that make it appropriate for the implications of the 2013 curriculum.

The application of Dick and learning design in the course of ICT Design and Multimedia as well as instructional impact and its accompanied learning outcomes for students (Sapri et al., 2019). The design used was Classroom Action Research (CAR) with steps of planning, implementation, observation, and reflection which consists of three Cycles. The subjects of this research were sit-in second-semester (even) students, consisting of 32 students. Data collected were measured on "instructional effects" or mastery of Multimedia Design and ICT lecture materials. Whereas to see the "impact accompaniment" technique used is observation. The results finding were summarized as follows. First, the application of learning design Dick and Carey can actualize the impact of instructional and accompanying student learning outcomes through steps; a) needs analysis to determine goals, b) conduct learning analysis, c) analyze students and their environment, d) formulate specific objectives, e) write down performance goals (learning objectives), f) develop learning strategies, g) develop learning materials, h) designing & developing formative evaluation, and i) revising the learning. The application of the Dick and Carey learning design is very effective to actualize instructional evaluation, and h) revising the learning. The application of the Dick and Carey learning design is very effective to actualize instructional impacts as a result of learning Multimedia and ICT Design courses for second-semester students of Education Technology University Bengkulu. The first cycle shows that the application of Dick and Carey Strategy in the learning of Multimedia & ICT Design Courses that should be able to actualize the instructional and accompanying effects of student learning outcomes in the ICT Multimedia Design Course second semester has not shown the expected results. The tools, media and sources prepared by the lecturers have not been fully utilized in learning. The instructional and accompanying effects are still lacking, this can be seen from the still large

dominance of the lecturers in conveying learning which results in ineffectiveness of the classroom atmosphere which causes students to remain inactive such as chatting, not discussing and processes learning is still dominated by smart students. The implications of the results revealed that lecturers can apply Dick and Carey's learning strategy in various courses, including those applied to Multimedia Design and ICT courses.

Research on the impact of the Dick and Carey instructional model on the performance of secondary school biology students in Katsina State, Nigeria (Sa'adu Matazu, 2023). Gender was also considered in the study to see if the Dick and Carey model could improve performance in biology regardless of gender. The study used a quasi-experimental design with pre-and post-test control groups. The study was guided by three null hypotheses. Purposive sampling was used to select four schools from the Funtua Educational Zone with a sample size of 140 senior secondary II biology students ranging from 14 to 17 years old. Two schools were assigned to experimental and control groups at random. The researcher instruments used were titled Dick and Carey Instructional Model Guide (DCIMG) and Biology Performance Test (BPT). The split-half method yielded a reliability index of 0.71 for BPT and data collected was analyzed using descriptive statistics and t-test analysis. The findings revealed a significant difference in the mean score of Katsina state students taught biology using Dick and Carey's instructional model versus the traditional method. The findings revealed that biology students in Katsina State secondary schools who were taught using Dick and Carey's instructional model outperformed those who were taught using the traditional lecture method of teaching biology. This implies that Dick and Carey's instructional model is a better approach to presenting biological concepts if the goal is meaningful and effective teaching and learning. Traditional methods for improving student performance, on the other hand, are unappealing, particularly in biology. The results showed that the experimental group treated with DCIMG outperformed the control group treated with the traditional method. Furthermore, gender does not affect student performance in biology. Thus, it was recommended, among other things, that DCIMG be used in biology teaching regardless of gender, especially when dealing with difficult concepts in biology.

The Impact of the Model on Academic Achievement and Learner Outcomes

Dick and Carey include cognitive and behavioristic elements that emphasize the learner's response to the stimulus presented. The implementation of this learning system design model requires a thorough systematic process. It is necessary to be able to create a learning system design that can be used optimally in overcoming learning problems. The use of the Dick and Carey model in the development of a subject is intended to: (a) at the beginning of the learning process, students can know and be able to do things related to the material at the end of learning, (b) there is a link between each component, especially learning strategies and desired learning outcomes, (c) apply the steps that need to be taken in planning learning design (Aji, 2016). Learning with Dick and Carey's instructional design is expected to be more interesting and fun to achieve learning objectives. The guided discovery method and concrete object media help direct and stimulate not only the imagination of students but also provide direct learning for students. So that the knowledge produced becomes more real and more concrete. Critical thinking ability as a very supportive component in the learning process is an ability that students need in the future to compete in the future.

The findings make a significant contribution to the development of the field of education by emphasizing the potential of the Dick and Carey model in enhancing instructional strategies. Providing a structured framework, this model enables educators to tailor their approaches to diverse learning needs, enriching methods for more effective and inclusive teaching. Additionally, the emphasis on task analysis within the Dick and Carey

model has implications for curriculum development, suggesting that in-depth task analysis can form a strong foundation for academic success.

One limitation may lie in the specific context of this research. Researchers could recommend future studies exploring the applicability of the Dick and Carey model across various educational settings, considering cultural, socioeconomic, and regional variations. Another limitation might be related to the unclear long-term impact of the Dick and Carey model on academic achievement. Future research could focus on longitudinal studies to assess the sustained effectiveness of this model over longer periods. Moreover, if the study did not thoroughly investigate the integration of technology in implementing the Dick and Carey model, researchers could recommend further exploration of the role of technology in enhancing instructional strategies. Another limitation might be associated with teacher training in adopting the Dick and Carey model. Future research could explore the training requirements for educators to effectively implement this instructional design framework. Lastly, the study may not have sufficiently addressed the needs of diverse learners. Recommendations could include further exploration of modifications or supplementary strategies within the Dick and Carey model to cater to students with diverse learning styles, abilities, and backgrounds.

## 4. CONCLUSION

As education continues to evolve, educators need to embrace effective instructional design strategies to maximize student success. The Dick and Carey Model has proven to be a game-changer in education by providing a systematic and learner-centred approach to instructional design. By aligning instructional goals with learner needs, conducting thorough instructional analysis and designing engaging instructional strategies, educators can create impactful learning experiences for their students' learner-centered approach, ensure accurate assessment of learning outcomes and enhance the development of instructional materials.

## 5. REFERENCES

Afacan Adanır, G., Muhametjanova, G., Çelikbağ, M. A., Omuraliev, A., & İsmailova, R. (2020). Learners' preferences for online resources, activities, and communication tools: A comparative study of Turkey and Kyrgyzstan. *E-Learning and Digital Media*, *17*(2), 148–166. https://doi.org/10.1177/2042753019899713.

Aji, W. N. (2016). Model Pembelajaran Dick and Carrey Dalam Pembelajaran Bahasa Dan Sastra Indonesia. *Kajian Linguistik Dan Sastra*, *1*(2), 119. https://doi.org/10.23917/kls.v1i2.3631.

Akomaning, E. (2019). Improving student internship through collaborative curriculum design: Needs and context analysis to inform the design process. In *Collaborative Curriculum Design for Sustainable Innovation and Teacher Learning*. https://doi.org/10.1007/978-3-030-20062-6_6.

Barzegar, R., Asghari Moghaddam, A., & Tziritis, E. (2016). Assessing the hydrogeochemistry and water quality of the Aji-Chay River, northwest of Iran. *Environmental Earth Sciences*, *75*(23). https://doi.org/10.1007/s12665-016-6302-1.

Bell, R., & Bell, H. (2020). Applying educational theory to develop a framework to support the delivery of experiential entrepreneurship education. *Journal of Small Business and Enterprise Development*, *27*(6), 987–1004. https://doi.org/10.1108/JSBED-01-2020-0012.

Bennett, R. E. (2011). Formative assessment: A critical review. *Assessment in Education: Principles, Policy and Practice*, *18*(1), 5–25.

https://doi.org/10.1080/0969594X.2010.513678.

Cairncross, S., & Mannion, M. (2001). Interactive multimedia and learning: Realizing the benefits. *Innovations in Education and Teaching International*, *38*(2), 156–164. https://doi.org/10.1080/14703290110035428.

Childs, E., Mohammad, F., Stevens, L., Burbelo, H., Awoke, A., Rewkowski, N., & Manocha, D. (2023). An Overview of Enhancing Distance Learning Through Emerging Augmented and Virtual Reality Technologies. *IEEE Transactions on Visualization and Computer Graphics*. https://doi.org/10.1109/TVCG.2023.3264577.

Darling-Hammond, L., & Snyder, J. (2000). Authentic assessment of teaching in context. *Teaching and Teacher Education*, *16*(5), 523–545. https://doi.org/10.1016/S0742-051X(00)00015-9.

Dick, W., Carey, L., & Carey, J. O. (1996). The Systematic Design of Instruction. *Educational Technology Research and Development*, *54*(4), 417–420. https://doi.org/10.1007/s11423-006-9606-0.

Dikmen, C. H. (2019). The Effect of Web-Based Instruction Designed by Dick and Carey Model on Academic Achievement, Attitude and Motivation of Students' in Science Education. *Journal of Learning and Teaching in Digital Age*, *4*(1), 34–40. https://dergipark.org.tr/en/pub/joltida/issue/55473/760109.

Faryadi, Q. (2012). Effective Teaching and Effective Learning : Instructional Design Perspective. *International Journal of Engineering Research and Applications*, *2*(1), 222–228. http://dr-qais.com/Qais%20Journal/Effective%20Teaching.pdf.

Fradd, S. H., Lee, O., Sutman, F. X., & Saxton, M. K. (2001). Promoting science literacy with english language learners through instructional materials development: A case study. *Bilingual Research Journal*, *25*(4), 479–501. https://doi.org/10.1080/15235882.2001.11074464.

Freeman, S., Eddy, S. L., McDonough, M., Smith, M. K., Okoroafor, N., Jordt, H., & Wenderoth, M. P. (2014). Active learning increases student performance in science, engineering, and mathematics. *Proceedings of the National Academy of Sciences of the United States of America*, *111*(23), 8410–8415. https://doi.org/10.1073/pnas.1319030111.

Khalil, M. K., & Elkhider, I. A. (2016). Applying learning theories and instructional design models for effective instruction. *Advances in Physiology Education*, *40*(2), 147–156. https://doi.org/10.1152/advan.00138.2015.

Kim, J. S., Burkhauser, M. A., Mesite, L. M., Asher, C. A., Relyea, J. E., Fitzgerald, J., & Elmore, J. (2021). Improving reading comprehension, science domain knowledge, and reading engagement through a first-grade content literacy intervention. *Journal of Educational Psychology*, *113*(1), 3–26. https://doi.org/10.1037/edu0000465.

Kirschner, F., Kester, L., & Corbalan, G. (2011). Cognitive load theory and multimedia learning, task characteristics and learning engagement: The Current State of the Art. *Computers in Human Behavior*, *27*(1), 1–4. https://doi.org/10.1016/j.chb.2010.05.003.

Konczak, L. J., Smith, D. E., Brumback, G. B., Buenger, V., Craig, S. B., Fink, A., Fleenor, J. W., Jones, R. G., Levy-Leboyer, C., Macan, T., Ree, M. J., & Thayer, P. W. (2011). Retooling HR: Using Proven Business Tools to Make Better Decisions About Talent by John W. Boudreau. *Personnel Psychology*, *64*(2), 529–531. https://doi.org/10.1111/j.1744-6570.2011.01217_1.x.

Lewis, J. (2023). *Instructional Design And Autism Evidence-Based Practices : The Dick And Carey Model* . Prorequest.

Manurung, D., Siagian, P., & Minarni, A. (2020). The Development of Realistic Mathematics Education Based Learning Tools to Improve Mathematical Problem Solving Ability and Self-Efficacy on Students in Junior High School 1 Lubuk Pakam. *Budapest*

*International Research and Critics in Linguistics and Education (BirLE) Journal*, *3*(1), 107–118. https://doi.org/10.33258/birle.v3i1.762.

Marzano, R. J., Pickering, D., & McTighe, J. (1993). *Assessing Student Outcomes: Performance Assessment Using the Dimensions of Learning Model*. https://eric.ed.gov/?id=ED461665.

Moore, M. G., & G.Anderson, W. (2003). A Theory of Critical Inquiry in Online Distance Education. In *Lawrence Erlbaum Associates, Inc.* http://doi.wiley.com/10.1111/j.1467-8535.2004.00409_10.x%0A.

Morrison, G. R. (Professor), Ross, S. M., & Kemp, J. E. (2006). Designing Effective Instruction. 5th Edition. *Jossey-Bass, An Imprint of Wiley*, 441.

Naqsyabandiyah, N., & Dehghanitafti, N. (2023). Developing Task-Based Learning Materials to Improve Students' Vocabulary Mastery Viewed from Linguistic Awareness. *Journal of Language and Literature Studies*, *3*(1), 37–52. https://doi.org/10.36312/jolls.v3i1.1088.

Nugraha, M. S., Qodriani, S. H., Dedih, U., Islam, U., Sunan, N., Djati, G., Islam, U., Sunan, N., Bandung, G. D., Islam, U., Sunan, N., & Djati, G. (2024). *Implementation Of The Dick And Carey Model In Improving Islamic Religious Education Learning At Assalam Middle School Bandung (Qur'anic Inspiration Material In Preserving Nature)*. *9*. https://doi.org/10.58788/alwijdn.v9i1.3550.

Oktarina, Y., Inderawati, R., & Petrus, I. (2022). Developing Local Culture-Based EFL Reading Materials for the 21st-Century Learning. *Studies in English Language and Education*, *9*(3), 1128–1147. https://doi.org/10.24815/siele.v9i3.24660.

Orlich, D. C., Harder, R. J., Callahan, R. C., Trevisan, M. S., & Brown, A. H. (2009). *Teaching Strategies: A Guide to Effective Instruction*. http://books.google.com/books?id=aKuEYJdGyTIC&pgis=1.

Powers, J. R., Musgrove, A. T., & Nichols, B. H. (2020). Teachers bridging the digital divide in rural schools with 1:1 computing. *Rural Educator*, *41*(1), 61–76. https://doi.org/10.35608/ruraled.v41i1.576.

Purnamasari, A. A., Normajatun, & Malawat, S. H. (2019). Disiplin Kerja Pegawai Kecamatan Liang Anggang Kota Banjarbaru. *Concept and Communication*, *null*(23), 301–316. https://doi.org/10.15797/concom.2019..23.009.

Sa'adu Matazu, S. (2023). Influence of Dick and Carey instructional model on secondary school biology students' performance in Katsina State, Nigeria. *Mediterranean Journal of Social & Behavioral Research*, *7*(3), 121–126. https://doi.org/10.30935/mjosbr/13301.

Sapri, J., Agustriana, N., & Kusumah, R. G. T. (2019). *The Application of Dick and Carey Learning Design toward Student's Independence and Learning Outcome*. *295*(ICETeP 2018), 218–222. https://doi.org/10.2991/icetep-18.2019.53.

Seidel, T., & Shavelson, R. J. (2007). Teaching effectiveness research in the past decade: The role of theory and research design in disentangling meta-analysis results. *Review of Educational Research*, *77*(4), 454–499. https://doi.org/10.3102/0034654307310317.

Setiadi, K., Djafri, N., Naway, F. A., Lamatenggo, N., Panai, A. H., & Ngiu, Z. (2022). Development of Islamic Education Learning Design in Independent Learning Era based on Dick and Carey in Senior High School. *Journal of Learning and Development Studies*, *2*(2), 10–21. https://doi.org/10.32996/jlds.2022.2.2.3.

Shannon, G. S., & & Bylsma, P. (2007). Nine Characteristics of High Performing Schools. *Olympia, WA: OSPI*, *January 2003*, 1–39. http://www.k12.wa.us/research/pubdocs/pdf/9characteristicsRresourcelist.pdf.

Smith, R., Snow, P., Serry, T., & Hammond, L. (2021). The Role of Background Knowledge in Reading Comprehension: A Critical Review. *Reading Psychology*, *42*(3), 214–240.

https://doi.org/10.1080/02702711.2021.1888348.

Telaumbanua, Y. N., Sinaga, B., Mukhtar, & Surya, E. (2017). Development of Mathematics Module Based on MetacognitiveStrategy in Improving Students' Mathematical Problem SolvingAbility at High School. *Journal of Education and Practice*, *8*(19), 73–80. https://www.researchgate.net/publication/318983738.

Tjeerd, P., & Nienke, N. (2013). Educational Design Research Educational Design Research. *Netherlands Institute for Curriculum Development: SLO*. http://www.eric.ed.gov/ERICWebPortal/recordDetail?accno=EJ815766.

Tomlinson, C. A., Brighton, C., Hertberg, H., Callahan, C. M., Moon, T. R., Brimijoin, K., Conover, L. A., & Reynolds, T. (2003). Differentiating instruction in response to student readiness, interest, and learning profile in academically diverse classrooms: A review of literature. *Journal for the Education of the Gifted*, *27*(2–3), 119–145. https://doi.org/10.1177/016235320302700203.

Yang, Y. T. C., & Wu, W. C. I. (2012). Digital storytelling for enhancing student academic achievement, critical thinking.; Learning motivation: A year-long experimental study. *Computers and Education*, *59*(2), 339–352. https://doi.org/10.1016/j.compedu.2011.12.012.