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**Research Article**

# From Idea to Innovation: Unveiling the Design-Based Research Experiences in a State University

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**ABSTRACT**

*Design-based research is a methodology that integrates theory and practice to develop innovative solutions in real-world educational settings.* This study employed a phenomenological approach, intended to understand the lived experiences design-based researchers towards their research undertakings from January to May 2024. It aimed to describe the experiences of design-based researchers in conducting DBR: challenges encountered, strategies employed in addressing the challenges, and insights gained. Twenty purposively sampled participants were interviewed using a validated open-ended questionnaire. The data were analyzed through reflexive thematic analysis. Where, the research revealed that design-based researchers experience a mix of fulfillment and challenges, including a lack of prior experience, time constraints, stress, financial limitations, and interpersonal conflicts. To navigate these hurdles, they employ strategies such as maintaining a proactive mindset, collaborating with stakeholders, and embracing flexibility and continuous learning. The study emphasizes the need for collaborative networks and mentorship while recommending enhanced support through training and resources to improve the DBR research process and outcomes.

***Keywords****: Design-based researchers, DBR, Phenomenology, Educational innovation, Iterative methodology*

## Introduction

Design-based research has emerged as a prominent methodology in the field of academia, particularly within the context of state universities. Design-Based Research (DBR) is a research approach that integrates empirical research with design-oriented theories, serving as an effective means to comprehend the quality, timing, and underlying causes of educational innovation phenomena in practice (Vaezi

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et al., 2019). DBR emphasizes the iterative process of designing, implementing, and evaluating interventions or solutions in authentic settings, with the goal of improving practice and generating theoretical insights. This methodology involves collaboration between researchers and practitioners to co-create solutions that have practical relevance and theoretical grounding (Barab & Squire, 2004). Design-based research involves researchers actively engaging in the design and development of innovative solutions to address real-world challenges and advance knowledge in various disciplines.

The study Reeves (2006) focuses on design research as a socially responsible approach to instructional technology research in higher education. The findings likely emphasize the importance of incorporating ethical considerations and social responsibility into instructional technology research within higher education settings. The study highlighted how design research methodology can lead to the development of innovative and ethical solutions that address real-world challenges in teaching and learning. Additionally, the research may underscore the significance of integrating social responsibility principles into the design and implementation of instructional technology to enhance educational practices and promote positive societal impacts within higher education institutions.

Within the dynamic landscape of a state university, design-based researchers navigate a diverse array of projects and initiatives aimed at driving innovation and contributing to the broader scientific community. Lavonen et al., (2006) emphasized the Design-Based Research (DBR) in science education as a step towards developing a methodology in this field. The findings highlighted the application of DBR to improve science education practices through iterative design, implementation, and evaluation processes. The study further revealed the importance of collaboration between researchers and educators to co-create innovative solutions that enhance teaching and learning in science education. Moreover, their research discussed how DBR contributes to the development of a systematic methodology for conducting research in science education, emphasizing the value of practical application and theoretical grounding in educational research.

The application of DBR as a methodology to design and evaluate innovative educational interventions in online science learning environments was reiterated in the study Hoadley and Campos (2022) their study discussed the iterative nature of DBR, where researchers collaborate with educators and learners to develop and refine interventions that enhance science education outcomes. They resulted on the importance of integrating theory and practice in the design of internet-based science education environments, emphasizing the role of DBR in bridging research and practice to improve teaching and learning experiences.

Design-based research is a methodological approach that is consistent with applied physics and engineering research procedures, where products are created with specific goals in mind (Scott et al., 2020). Lavonen et al., (2006) group has been engaged in research projects aimed at enhancing science education practices. The projects have been centered around the following areas: educational software and hardware design, emphasizing the analysis of the designed artefact (microcomputer-based laboratory system); analysis of the designing process; learning environment designing, ranging from primary school mechanics to upper secondary school electronics; and environment analysis.

Design-based research in a state university setting offers a unique set of experiences that often include both challenges and opportunities for researchers. According to Danganan and Gamboa (2019), the lived experiences of researchers engaged in technology-generated research highlight their curiosity and determination as primary motivators, driving them to explore innovative projects. However, the complexity of producing design-based research, which involves simultaneous development of prototypes and manuscripts, poses significant challenges, including time management, technical skills deficiencies, and the demand for both academic and practical knowledge. Researchers frequently encounter an overlapping of their roles as creators, designers, and

writers, necessitating the navigation of both personal and operational challenges within a context of limited resources. This multifaceted engagement highlights the complexity of their work, as they strive to balance various responsibilities while addressing the constraints imposed by their environment (Bocar, 2009). Ultimately, these experiences not only foster a deeper understanding of technology's role in research but also enhance the researchers' commitment to contributing positively to their communities (Danganan & Gamboa, 2019).

Through a design-based research (DBR) effort, a module for an in-service teacher education course was created that specifically addresses the needs of science teachers (Lavonen et al., 2006). In addition, the data revealed that it was critical to explain the benefits and limitations of adopting ICT applications in science education, as well as to introduce and have a conversation with instructors about both technical and pedagogical usability. Furthermore, different perspectives on meaningful learning and motivational elements of science teaching and learning are provided by a theoretical examination of the usability of ICT applications.

Pugh et al., (2023) mentioned that the design-based research (DBR) collective in the mode of the design was used in collaboration with a high school biology teacher in designing, investigating and refining a technology-enhances activity that will expand pupil's perspective on biological concept. Implementation of the program resulted into positive student's engagement (Cropp et al., 2022).

Hoadley and Campos (2022) emphasize the importance of Design-Based Research (DBR) in studying online learning, highlighting its iterative and collaborative nature. Their research underscores the value of integrating DBR principles to drive advancements in educational practices and enhance teaching and learning outcomes within online learning environments. Design-based researchers bring a unique perspective to their work, drawing upon their expertise, creativity, and collaborative spirit to tackle complex problems and generate impactful solutions. Danganan and Gamboa (2019) explored the relationship between researchers and technology. Their findings highlighted the lived experiences and perspectives of researchers engaging with technology, providing insights into the impact of technology on research practices and methodologies. The experiences of design-based researchers in a state university setting offer a rich tapestry of insights into the processes, methodologies, and outcomes of research endeavors that shape the academic landscape.

As design-based researchers immerse themselves in the academic environment of a state university, they encounter a myriad of challenges and opportunities that shape their research journey. From balancing theoretical frameworks with practical applications to collaborating with multidisciplinary teams and addressing unexpected hurdles, these experiences provide valuable learning opportunities and foster growth as researchers. Though exploration of the experiences of design-based researchers in a state university, a deeper understanding of the complexities and nuances of research practices within the academic setting can be gained.

The state university serves as a hub of resources, expertise, and support for design-based researchers, offering a conducive environment for research innovation and collaboration. Researchers benefit from access to cutting-edge facilities, a network of scholars with shared research interests, and a supportive community that fosters a passion for academic inquiry. These resources play a pivotal role in shaping the experiences of design-based researchers and enhancing the quality and impact of their research endeavors within the state university setting.

The Commission on Higher Education's main goal is to advance an effective research agenda that will address societal issues. Research is a requirement for both teachers and students in higher education. It is mandatory for the universities to put emphasis on technology as the main area of study. As a result, in order to realize this idea, educators and students need to be trained in doing design-based research. Teacher involvement is a major accomplishment since it aims to support the adoption of technology in all areas of education. These educators are faculty researchers who help students grasp how technology may be used in

the classroom to prepare them for the workforce.

In light of the experiences of design-based researchers in a state university, there is a growing recognition of the need for a best practices framework to guide and optimize research practices in science-related fields. By synthesizing the insights and lessons learned from these experiences, researchers can develop a framework that promotes excellence, innovation, and collaboration in science-related research within the academic realm. This framework aims to establish guidelines, principles, and strategies derived from the experiences of design-based researchers to enhance research outcomes and drive continuous improvement in research practices within the state university context.

Within the field of education, the experiences of design-based researchers in a state university serve as a focal point for innovation and advancement in research practices. While numerous studies have explored the application of Design-Based Research (DBR) in educational settings, there remains a notable gap in understanding the specific experiences and challenges faced by design-based researchers within the unique context of a state university. The intricate interplay between academic structures, institutional policies, and collaborative dynamics within a state university setting presents a complex landscape that warrants further exploration to uncover the nuances of conducting DBR in this environment.

The experiences of design-based researchers in state universities often reveal a research gap concerning the practical implementation and adaptation of innovative educational interventions, as highlighted in the existing literature. While design-based research (DBR) is recognized for its potential to generate usable knowledge tailored to local contexts, there remains a lack of comprehensive studies that examine the nuanced challenges faced by researchers operating within the bureaucratic structures and diverse institutional cultures of state universities. This is compounded by the logistical difficulties of sustaining long-term partnerships with practitioners, which are essential for effective DBR but can be undermined by institutional constraints and the varying degrees of readiness among educators to adopt new methodologies. Consequently, the need for targeted investigations into how state university researchers navigate these dynamics, negotiate their dual roles as advocates and evaluators, and ultimately contribute to scalable educational innovations remains an important and underexplored area of research within the field, as DBR's promise for fostering educational reform can be impeded by these contextual challenges.

The research explored the experiences of design-based researchers in a state university. It highlighted the need to identify and understand the unique challenges, opportunities, and best practices encountered by researchers in integrating design-based research methodologies within the academic environment.

Specifically, it sought to find answers to the following questions:

1. How do design-based researchers describe their experiences?
2. What are the challenges faced by design-based researchers in the university setting?
3. How do design-based researchers address challenges in design-based research (DBR)?
4. What are the insights gained from the experiences of design-based researchers?

## Methods

### *Research Design*

This study utilized phenomenological study that aimed to explore the lived experiences and perspectives of design-based researchers in a state university. According to Creswell (2013), phenomenology is a qualitative research approach that focuses on understanding individuals' subjective experiences and the meanings they attribute to those experiences. By exploring into the subjective experiences of researchers, this study seeks to uncover the underlying meanings, insights, and challenges encountered in conducting design-based research within the academic context of a state university. The research design focuses on capturing the essence of these experiences to inform the development of a best practices framework

that can enhance the effectiveness and impact of science-related research initiatives.

### *Sources of Data*

*Research Setting of the Study*

The location of the study is one of the state universities in Pampanga focusing on science and technology. The locale was selected because of the availability of participants especially under the College of Industrial Technology, College of Engineering and Architecture, College of Arts and Sciences, and College of Computing Studies.

*Sampling*

A total of 20 participants was interviewed. A sample size of 20 participants is sufficient for this phenomenological study because it allows for in-depth exploration of the lived experiences, ensuring rich data saturation while remaining manageable for analysis. The researcher made use of purposive sampling in choosing the participants of the study. The participants were chosen based on their capacity to do design-based research. Criterion sampling was also used to focus on the population of researchers. The participants were classified based on the following criteria: a) having completed one or more design-based research projects; b) specializing in the field of Science and Technology; c) must be a permanent faculty member. Participants for interviews and focus group discussions based on their expertise and experience in design-based research were selected within the state university context.

*Instrumentation and Data Collection*

This research made use of semi-structured interview guide. A set of open-ended questions guided the interviews, focusing on the experiences, advantages and disadvantages, challenges and strategies of the participants regarding their experiences in design-based research. The interview questions were developed based on the research questions and reviewed by researchers with varied experiences in qualitative research and educational research. The Interview guide was validated by experts to ensure that the questions are clear, relevant, and effectively capture the research phenomenon. The interview guide was also pilot tested to a small group, seeking feedback from experts, and refining questions based on the feedback received to enhance the quality and reliability of the data.

The basic data gathering technique is the interview in the phenomenological design. In order to reveal the experiences and meanings of the phenomena, the interview technique offers the researchers the possibility of asking questions of interaction, flexibility and further discussion.

This interview technique was used and individual semi-structured interviews with the participants were conducted. The interviews lasted between 45 minutes to one hour per participants, allowing for in-depth exploration of participants' experiences. The actual duration depends on the richness of the participant's narrative and the researcher's judgment of data saturation.

*Data Management and Analysis*

Data gathered was transcribed and subjected for reflexive thematic analysis. Various themes were derived from the codes which has been interpreted based on the key informants' lived experiences and the researcher's existing knowledge. To preserve confidentiality, participants identified were coded to BDR which means design-based researchers. The data were analyzed using the following steps, the epoche, phenomenological reduction, imaginative variation and synthesis. In the epoche, the researchers blocked biases and personal assumptions regarding to the existing phenomenon. In the second step, the phenomenological reduction, the researchers described the data with a context. This includes bracketing, categorizing themes. The next step, the imaginative variation, wherein the frames of reference and the perspectives diverged and by means of employing polarities and reversals. In this stage, intuition is purely imaginative and not empirical. Through imaginative variation the researcher can derive structural themes. The final step in the phenomenological research is the synthesis, where meanings and essences of the themes were connected to formulate a detailed diagram. (Moustakas, 1994)

*Trustworthiness*

To establish the trustworthiness of this exploratory study on experiences of Design-based researchers, several measures will be taken. First, the research design and methodology were clearly outlined and justified, providing transparency and allowing for replication by future researchers. Second, data collection was carried out through interview with the use of questionnaires and semi-structured interviews, to ensure a comprehensive and varied data set. Third, the data analysis process involved the researchers independently coding and analyzing the data, with regular discussions and checks to ensure the reliability and consistency of the findings. Fourth, member checking was conducted, where the participants were be given the opportunity to review the findings and provide feedback to ensure that their perspectives are accurately represented. Lastly, the researchers were maintained reflexive journals throughout the research process, documenting their own biases and assumptions and reflecting on their impact on the research. This ensured that the findings are credible and trustworthy, and that the research process is transparent and accountable.

*Ethical Considerations*

As with any research involving human participants, ethical considerations are of utmost importance in this exploratory study about the experiences of design-based researchers in a state university. All participants were provided with a clear and detailed explanation of the research objectives and procedures, including the risks and benefits of participation. They were given the opportunity to provide their voluntary and informed consent to participate. The researchers ensured that all participant information is kept confidential and anonymous. Pseudonyms were used instead of actual names, and any identifying information were removed from the data. The researchers ensured that all data collected is securely stored and protected from unauthorized access or use. The researchers treated all participants with respect and dignity, and ensure that their rights and welfare are protected at all times. The participants were given the opportunity to debrief and discuss any concerns or questions they may have about the study.

## Result and Discussion

As a result of the analysis made in this research aiming to describe the experiences of the design-based researchers in a state university, identify the challenges faced by design-based researchers in the university setting, narrate the strategies used by the researchers to address challenges in design-based research (DBR) and describe the insights gained from the experiences of design-based researchers inform the development of best practices and support structures for conducting design-based research (DBR) within universities.

### *Description of the experiences of the Participants in Conducting Design-based Research*

*A.1. DBR is a fulfilling experience*

Participants express feelings of fulfilment, satisfaction, and enjoyment in engaging in design-based research. They highlight valuable learning opportunities, personal growth as researchers, fostering creativity, and a sense of commitment to producing meaningful outcomes. The responses also indicate that the research process was beneficial in terms of developing skills such as working independently, being more analytical, and gaining a thorough understanding of the subject matter. Overall, the theme underscores the positive impact of design-based research on the participants' professional and personal development.

*As the participants narrated:*

"In regards on my experience on this type of research is in satisfactory in terms of university setting because it is essential in terms of our needs. it is all about technology base and it is also use in extensions purposes if the study is relevant in day-to-day basis." – DBR 8

"My experiences as a design-based researcher in the university setting have been instrumental in shaping my research skills, fostering creativity, and driving my commitment to producing meaningful and impactful research outcomes." - DBR 5

"I learnt how to work independently, how to be more analytical in my work, this was beneficial since it allowed me to be able to learn something." - BDR 14

Participants' positive experiences in design-based research align with existing literature. According to Galang (2014), engagement in research activities can lead to feelings of fulfilment and satisfaction, contributing to personal growth and creativity. Additionally, Brown (1992) found that research involvement enhances analytical skills and promotes a deeper understanding of the subject matter. These findings support the notion that design-based research can positively impact researchers' professional and personal development, aligning with the themes of fulfilment, satisfaction, and skill development expressed by the participants.

*A.2. DBR is a challenging experience*

Conducting design-based research perceived to be challenging among the participants. The participants engaged in design-based research face numerous challenges. Some of experiences of design-based researchers are as follows:

"Doing DBR is really stressful, too many things to be considered: process, procedure, protype and manuscript writing." DBR1

"It is very challenging; budget and time management is really important." DBR5

"One disadvantage of design-based research is that it can be time-consuming and may require significant resources to implement efectively." - DBR 11

"DBR projects may require access to specialized equipment, technology, and funding, which can pose challenges for researchers, particularly in resource-constrained academic settings" - DBR 13

Contrary to the statement of Galang (2014) that doing research is fulfilling, in this study design-based researchers engaged in design-based research face numerous challenges, including financial constraints and inadequate facilities, which impede their ability to effectively carry out their projects (Danganan & Gamboa, 2019).

*A.3. DBR is a new learning opportunity for innovative educational practices*

The importance of balancing theoretical frameworks with practical applications in design-based research, emphasizing the collaboration with multidisciplinary teams to develop and apply authentic knowledge that benefits educators and learners was also emphasized by some of the participants. The participants highlighted the importance of connecting theoretical concepts with practical applications to drive positive transformations in educational approaches, enhance theories, generate novel learning results, and ultimately enhance educational methodologies for the betterment of individuals. As evident the participants shared the following transcription:

"Navigating the complexities of design-based research, such as balancing theoretical frameworks with practical applications, collaborating with multidisciplinary teams, and addressing unexpected challenges, has also presented me with valuable learning opportunities and growth as a researcher. "- DBR 4

"The goal is to directly change practice and advance theories that benefit others. DBR is pragmatic, interventionist, and collaborative, emphasizing context-specific innovations and their influence on learning. It's a dynamic process that balances theory development and practical application, resulting in authentic and usable knowledge for both educators and learners." - DBR 9

It is crucial to acknowledge that DBR goes beyond enhancing practice to also contribute to the advancement of theory and comprehension (Collins et al., 2004). DBR strengthens the knowledge assertions of the research. Researchers explore cognition within specific contexts with the overarching objective of formulating evidence-based assertions derived from a combination of controlled experiments and real-world observations to enhance understanding of learning processes (Barab & Squire, 2004). This newfound knowledge about learning subsequently influences and guides future research and practical applications.

### *Challenges met by the Participants in Doing Design-based Research*

Conducting design-based research is not an easy thing to do, this was proven by the experiences of the researchers in doing the research. Since design-based research is new among the participants, they reiterated that problems are encountered along the way. The enumerated problems were emerged as themes in this study. Some of the challenges met by the participants in conducting design-based research are: 1. Lack of experience in doing design-based research

*B.1. Lack of Experience in Doing Design-based Research.*

The most common challenges of the participants are their lack of experiences in conducting design-based research. According to them, since the approach is new, they don't have enough knowledge on the processes and procedures. As some of the participants narrated:

"I do not know that this type of research is a requirement for us. Since this is new to us, I honestly don't know what to do, I am not comfortable with the step and the procedure in doing the prototype is a bit hard for me." -DBR 3

"I believe the DBR is a complex approach, imagine, I have to do the manuscript and do the technology at the same time." -DBR 6

"I have to study first and research how to do DBR, the methods is really a problem for all of us. It's like doing 2 research at the same time" - DBR10

The lack of experience in conducting design-based research often poses significant challenges for researchers, as they must navigate both the technical aspects of project development and the complexities of manuscript preparation. This insufficiency in experience can lead to difficulties in balancing time management and resource availability, ultimately impacting the overall quality and completion of research project. (Danganan & Gamboa, 2019). As Cobb et al., (2003) agreed that inexperienced researchers may struggle with navigating the complexities of design-based methodologies and project management, leading to feelings of inadequacy and frustration

*B.2. Time Constraints*

Design-based researchers often struggle to balance multiple responsibilities, such as teaching, administrative duties, and research commitments, which can lead to delays in project completion (Danganan & Gamboa, 2019). Most of the participants narrated:

"I am overload when it comes to teaching load, I don't have time to finish my research" – DBR3

"Too many works to accomplish, I am always worried about the deadlines." – DBR 6

The participants consistently point out the time-intensive aspect of design-based research, stressing the substantial commitment needed for planning, implementation, data collection, analysis, and time management. This highlights the hurdles presented by time limitations in conducting comprehensive and meticulous research, requiring researchers to dedicate significant time across different research phases. The following narratives shows the noted disadvantages of design-based research as perceived by the participants:

"The iterative nature of design-based research (DBR) can be time-consuming, requiring significant investment in planning, implementation, data collection, and analysis." - DBR 1

"It is effort making capacity, time consuming, and a product of trial and error." - DBR 4

"One disadvantage of design-based research is that it can be time-consuming and may require significant resources to implement effectively." - DBR 11

The iterative nature of design-bases research makes the researcher experiences challenges in time management because these iterations involve a systematic refinement of the design, where each adjustment and subsequent testing function as a miniature experiment (Barab & Squire, 2004; Collins, 1992).

*B.3. Stress*

The stress associated with design-based research arises from the need to manage multiple responsibilities, including project development and manuscript writing, which can be

overwhelming for researchers who already have teaching duties (Danganan & Gamboa, 2019) The participants in the study shared:

"So stressful. Doing the manuscript and the product at the same time." DBR1

"I am deprived of sleep and I am very anxious if I can finish all this. I am so much stressed with DBR." -DBR 4

"Doing DBR is really stressful, too laborious and you need to be well-versed with the process and you to be knowledgeable in writing the manuscript."- DBR 9

Design-based research (DBR) often creates stress for researchers as they strive to balance the demands of generating practical educational products while simultaneously contributing to theoretical knowledge in the field. This tension highlights the need for clearer communication and documentation of the theoretical contributions of DBR projects to alleviate the pressures faced by researchers when navigating the complexities of the research-practice gap (Haagen-Schützenhöfer et al., 2024).

*B.4. Financial Constraints*

Financial constraints significantly hinder the progress of design-based research, as many researchers reported that the lack of budget influences their ability to acquire necessary materials and equipment for project development. Additionally, participants highlighted that financial limitations often result in delays, particularly during the initial phases of research, which can lead to increased stress and impact the overall quality of their work (Danganan & Gamboa, 2019). The participants noted:

"Doing DBR is costly, the production of prototype" -DBR2

"The main problem is budget. I don't have enough money for testing and other expenses." -DBR7

"Making the protype is no joke, it is very expensive." DBR10

Financial constraints can significantly hinder the implementation of design-based research (DBR) projects, as limited funding may restrict the ability to create and test innovative educational interventions. Furthermore, these financial limitations can lead to a diminished quality of collaboration with practitioners, which is essential for addressing real-world problems and enhancing the applicability of DBR outcomes.

*B.5. Interpersonal Conflicts*

In doing research, sometimes you need to collaborate and communicate all the ideas well to your groupmates. Research teams often disagree because different people have different ideas. These disagreements can cause problems. The participants of this study shared:

"There are times that I want to the task alone, sometimes my ideas are not related to my groupmates ideas"-DBR1

"Communication is always the key, my groupmates ideas varied, so we have to resolve first interpersonal conflicts."-DBR3

"We have to respect different ideas, that leads us to delayed conceptualization process and brainstorming'" DBR7

Interpersonal conflicts can arise in design-based research (DBR) due to differing priorities and perspectives between researchers and practitioners involved in collaborative efforts, which can impede the design and implementation of educational interventions. These conflicts may lead to challenges in communication and understanding, ultimately affecting the efficacy of the research and its relevance to real-world practices (Haagen-Schützenhöfer et al., 2024).

***Strategies Used by the Design-based researchers in addressing the Challenges***

Design-based researchers utilized strategies in addressing the challenges they encountered. These strategies are vital in enhancing their outputs. There are six (6) themes emerged as the strategies of the participants in addressing the challenges they encountered.

*D.1. Maintaining a Proactive and Composed Approach.*

This theme is based on the responses of the participants and it stress the significance of proactively and calmly addressing challenges and tasks. This theme highlights the value of taking initiative, preparedness, and maintaining composure in diverse situations. By embracing a proactive mindset and com-

posure, individuals can adeptly navigate obstacles, make informed choices, and handle responsibilities confidently and efficiently. Narratives of the design-based researchers are as follows:

"It is important that I am aware of the problem and be proactive in recognizing the obstacles so that I can understand the possible implication."-DBR1

"It is a must to stay composed with the phasing and trust the process as time goes by."-DBR 10

"I stay calm and focus on the problem. I tend to seek advice in case I need some assistance to possibly solve specific problem." DBR15

Maintaining a proactive and composed approach is essential in design-based research (DBR), as it enables researchers to effectively navigate the complexities of educational settings while balancing the demands of practical relevance and theoretical advancement (Haagen-Schützenhöfer et al., 2024).

*D.2. Collaborative Problem-Solving and Stakeholder Engagement.*

Participants emphasize the importance of engaging in collaborative problem-solving by involving stakeholders, seeking experts' assistance, and fostering collaboration through consultative meetings and SWOT analysis. They highlight the value of collaborating with stakeholders to brainstorm solutions, iterate designs based on feedback, and align goals with practical needs. The design-based researchers shared the following:

"Engaging in collaborative problem-solving with team members, stakeholders, and experts in relevant fields can provide diverse perspectives and potential solutions to address challenges in design-based research." – DBR 2

"Involving stakeholders, such as educators, students, administrators, and external partners, in problem-solving discussions and decision-making processes can foster collaboration, shared ownership of challenges, and collective efforts to address obstacles in design-based research."- DBR 6

"We asked for experts' assistance" - DBR 8

Danganan and Gamboa (2019) emphasized that collaborative problem-solving among researchers and stakeholders significantly enhances the effectiveness of design-based research, as researchers often rely on peer support and guidance to navigate challenges in project development and manuscript writing. Furthermore, engaging various stakeholders, including university administrators and fellow researchers, fosters a more supportive environment that addresses resource limitations and promotes a shared commitment to the successful implementation of innovative projects

*D.3. Flexibility, Adaptability, and Continuous Learning.*

Design-based researchers emphasize the importance of being flexible and adaptable in the research process, which includes ongoing evaluation, trial and error, reading, and continuous learning. The participants highlighted the value of remaining open to alternative options and flexible with research methods to adapt to changing circumstances and optimize outcomes. As shown on the narratives of the participants:

"Remaining flexible and adaptable in response to challenges allows me to adjust their approach, modify strategies, and explore alternative solutions to overcome obstacles in the research process." - DBR 3

"When I engage myself in reflective practices and ongoing evaluation of the research process, I learned from challenges, identify areas for improvement." – DBR 5

"Reflection. Trial and error. Reading" - DBR 7

Incorporating ongoing evaluation, trial and error, and a commitment to continuous learning, researchers can enhance their problem-solving capabilities, refine their approaches, and achieve greater success in their research pursuits.

Insights Gained by Design-based Researchers in Using Design-based Research

In terms of the insights gained by the researchers from the experiences. The participants emphasized the development of best practices for conducting design-based research in universities. Three (3) themes emerged as the insights gained by the design-based researchers in using the method.

*E.1. Establishing Collaborative Networks and Conducting Consultations*

The design-based researchers highlighted the importance of building collaborative networks to facilitate connections, knowledge sharing, and support among researchers. They give emphasis on the value of conducting consultations to assist future researchers in navigating challenges, seeking advice, and accessing resources. As some of the participants narrated:

"Building collaborative networks within and across universities can facilitate knowledge sharing, interdisciplinary collaboration, and the exchange of best practices in design-based research." - DBR 1

"Task management is the key. To help future researchers, consultations must be conducted." -DBR 11

"Consultation is necessary to ensure proper conduct of the DBR." -DBR12

The narration of the participants points out the significance of establishing collaborative relationships, fostering a culture of knowledge exchange, and providing mentorship and guidance to support the growth and development of researchers within the community. Getenet (2019) agreed that through actively engaging in collaborative networks and offering consultations to future researchers, individuals can contribute to a supportive and interconnected research environment that promotes learning, collaboration, and innovation in the field.

*E.2. Promoting Reflective Practices and Best Research Design*

The participants of the study stress the importance of promoting reflective practices, peer feedback, and critical thinking to enhance research processes and outcomes. As shared by the participants:

"Such type of research do not only contribute to the university but to best practices of innovation, creativity, and development." DBR3

"Practices as such allows me to think outside the box and unleash my critical and creative skills." - DBR 6

"Encouraging reflective practices, peer feedback, and critical reflection on research processes and outcomes can foster a culture of continuous learning, improvement, and innovation in design-based research practices within universities." - DBR 14

"Learning from previous studies that used design-based research is a must so that the different recommendations from these studies will be utilized well. The development of the best practices will be obtained if a proper scanning of best methods and insights will be done." - DBR 19

Promoting reflective practices within design-based research (DBR) is essential for identifying the effectiveness of educational interventions, as it allows researchers to critically analyze their methodologies and outcomes, fostering a deeper understanding of both theoretical and practical implications. Moreover, best research design in DBR involves iterative cycles of planning, implementing, and evaluating teaching solutions, ensuring that the insights gathered contribute to both local theories and broader educational frameworks, thereby enhancing the overall quality of educational research (Haagen-Schützenhöfer et al., 2024).

## Conclusion

This study reveals a multifaceted experience of design-based research (DBR) among university researchers, characterized by both significant fulfillment and considerable challenges. While participants consistently described DBR as a rewarding process fostering personal and professional growth, enhancing analytical skills, and promoting a sense of accomplishment in creating meaningful educational outcomes, they also highlighted significant hurdles. These included a lack of prior DBR experience, resulting in difficulties navigating the complexities of the methodology; considerable time constraints stemming from competing teaching and administrative responsibilities; stress related to the simultaneous demands of project development and manuscript writing; financial limitations impacting resource acquisition and prototype development; and interpersonal conflicts within research teams. These findings resonate with existing literature highlighting the resource-intensive nature of DBR and the need for robust support structures within universities.

Despite these challenges, participants employed several effective strategies to navigate their DBR experiences. These included maintaining proactive and composed approaches to problem-solving, actively engaging in collaborative efforts with stakeholders and experts, and embracing flexibility and continuous learning throughout the research process. The insights gained from these experiences underscore the importance of establishing strong collaborative networks within and across universities, facilitating knowledge sharing and mentorship. Furthermore, the study highlights the need for promoting reflective practices, peer feedback, and critical analysis to enhance both the quality and impact of DBR projects. These findings offer valuable recommendations for supporting DBR researchers within universities, including providing adequate training, resources, and mentorship opportunities to mitigate the challenges and maximize the benefits of this impactful research methodology.

## Limitations of the Study

The study's findings are limited by its reliance on a relatively small sample of university researchers, potentially limiting the generalizability of the results to broader populations of DBR practitioners. Furthermore, the cross-sectional nature of the data collection prevents a longitudinal analysis of the evolving challenges and strategies employed by DBR researchers over time.

## Recommendation

Based from the conclusion of the following are recommended:

1. Universities should provide dedicated training and resources for DBR, including workshops on methodology and project management, to address the lack of prior experience among researchers.
2. Increased funding for DBR projects is crucial to alleviate financial constraints and support the development of high-quality educational interventions.
3. Mentorship programs pairing experienced DBR researchers with novices can foster collaboration and provide valuable guidance, mitigating stress and promoting best practices.
4. The field of education should actively promote the use of DBR through funding initiatives, collaborative research networks, and dissemination of successful DBR projects to highlight its value and encourage wider adoption.

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