



Designing Better Educators: Impact of Using Active Learning to Enhance Design Thinking Training in Higher Education

*Y d Plessis¹

¹Departement of Applied Management Program, Faculty of Management Science, Durban University of Technology, South Africa

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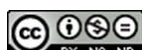
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ABSTRACT

To maintain instructional relevance in a dynamic environment, educational institutions increasingly require professional learning models that are dynamic and interactive. Active learning workshops support immediate changes, as well as long-term enhancements in teaching strategies. The study evaluated how educators' comprehension and readiness to apply design thinking ideas were affected by a hands-on, practical approach to training. Data were gathered using a longitudinal, mixed-method study utilizing pre- and post-workshop surveys conducted over a two-week duration. The study involved Human Resources Management (HRM) educators from a selected university in South Africa. Participants were diverse in gender, aged between 18 and 69, with experience ranging from less than 1 year to over 10 years. Furthermore, the majority of participants are of Black and Indian ethnicity. The research instrument for the study was a structured questionnaire featuring both pre- and post-tests, incorporating open- and closed-ended items. The study emphasized the advantages of professional development workshops that use a practical, hands-on approach to learning that will have an impact on students' success. The results of the study demonstrated that participants showed a significantly better understanding and preparedness to implement design thinking after the workshop. Furthermore, data revealed that the impact of the workshop had both immediate and long-term improvements that included practical outcomes, increased empathy, and mindset shifts.



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INTRODUCTION

In recent years, universities have encountered significant criticism for allegedly failing to equip students with the advanced cognitive and problem-solving skills essential for higher education, as an increasing number of studies underscore the necessity for college graduates to develop the cognitive frameworks required to address intricate, real-world challenges alongside acquiring specialized knowledge. (Wright & Wrigley, 2019; McLaughlin et al., 2022; Wilkie, 2019). With design thinking becoming a top priority, the question that needs to be asked is, are educators that integrate design thinking principles into the curricula equipped with sufficient knowledge and understanding of design thinking themselves?

According to Hyttinen (2021) and Ericson (2022), design thinking has shown great promise in developing sophisticated reasoning and problem-solving abilities, which are critical for dealing with challenging, real-world problems. However, educators must possess the necessary knowledge and abilities for design thinking to be successfully incorporated into the curricula.



Without the right training that ensures both immediate and long-lasting impact, educators would find it difficult to successfully implement these approaches, which could result in students lacking important skills. To close the gap between educational expectations and outcomes for students, it is imperative to focus on educators' professional development in design thinking and the subsequent application into curricula.

However, an additional gap still seems to exist in the amount of research that focuses specifically on design thinking training for educators. To contextualize the research gap, a literature search was conducted on Scopus in July 2025. The search terms 'design thinking' and 'training,' as well as 'educators,' for the years 2020-2024 yielded 208 publications. A parallel search for the terms 'design thinking' and 'students' returned 1,348 publications during the same period. This notable discrepancy emphasizes the need for additional studies on the application of design thinking to improve educators' ongoing professional development. Wrigley and Mosely (2022) and Li & Zhan (2022) support these findings and agree that research on design thinking in teaching and learning is both lacking and narrow and limited. Closing this gap is essential to bringing educational practices into line with the demands of an ever-changing world and equipping educators to instruct and motivate the next generation of students.

Due to the exponential rise of the popularity of design thinking in a relatively short period, tertiary education programs have not been able to keep up. Developing a new program within institutions, building reputation and support, gaining approval, developing curriculum, and finding academics to teach those courses takes time and cannot keep pace with the fast pace of industry and organizations (Guaman-Quintanilla et al., 2022).

Therefore, it is suggested by the study that design thinking training needs to be hands-on with a focus on a mindset change to ensure that as changes with the internal and external environment of educators occur, the educators are able to adapt. Research by Noh and Karim (2021) presented seven dimensions to the design thinking mindset in education, which includes, amongst others, human-centeredness, empathy, experimentalism, and collaboration. These dimensions were included in the design of the workshop's active learning approach. Therefore, the research question for the study is, "How can hands-on design thinking workshops enhance educators' short- and long-term professional development?"

With active learning emerging in the late 19th century as a response to passive learning models, philosophers like John Dewey advocated for experiential learning through real-life experiences and active participation (Bonwell & Eison, 1991). Numerous studies have substantiated the role of active learning in improving engagement, achievement, and conceptual understanding, which also relates to higher-order thinking (Sulaiman & Abdulla, 2024; Freeman et al., 2014; Li, Lund & Nordsteinen, 2023). In addressing the gaps identified earlier and in developing a novel approach, this study presents a novel method to active learning that prioritizes experiential learning and real-world application to fill the gap found in conventional professional development approaches.

Rather than theoretical education, the participants of the study, who were educators, were required to bring a module study guide they would be teaching in the next semester. The participants worked on this module step-by-step during the workshop while learning the fundamentals of design thinking. The aim of this format of training was to ensure that participants not only understand the design thinking principles within the context of their disciplines but also, equally, through hands-on application, leave the workshop with an immediate outcome, reducing delays in the implementation process. Supported by Ertmer and Ottenbreit-Leftwich (2010), Spaan et al. (2023), and Lo (2021), the authors emphasize that for effective learning and skills development in professional development to occur, hands-on learning for educators needs to be adopted. According to the authors, educators can directly integrate new ideas and methods into their practice with a practical approach within the context

of their own classroom, which promotes a deeper understanding and retention of the subject matter (Ertmer & Ottenbreit-Leftwich, 2010).

Constructivist theory and Kolb's experiential learning theory serve as the foundation for this paper's motivation. According to experiential learning theory, knowledge is produced by transforming experience, emphasizing learning via experience (Morris, 2020). This is in line with the practical method of working on an actual module study guide, which enables educators to gain knowledge by doing and thinking back on their experiences. This approach is further supported by constructivist theory, which holds that students build knowledge via active involvement and interaction with their surroundings (Saleem et al., 2021). This method promotes deeper comprehension and meaningful learning by including educators in the active redesign of their module and lesson plans, which is in line with constructivist ideas.

This study seeks to highlight the efficacy of design thinking in education by examining participants' preparedness, views of the workshop's usefulness, and their capacity to adapt its principles to other facets of their job. More specifically, the purpose of the study is to analyze the perceptions and outcomes of employing a unique, hands-on approach where educators work on their own study guides during the workshop. The results are intended to contribute to the current discussion as well as add new knowledge on improving teaching methods through creative approaches and to guide future professional development workshop training.

RESEARCH METHOD

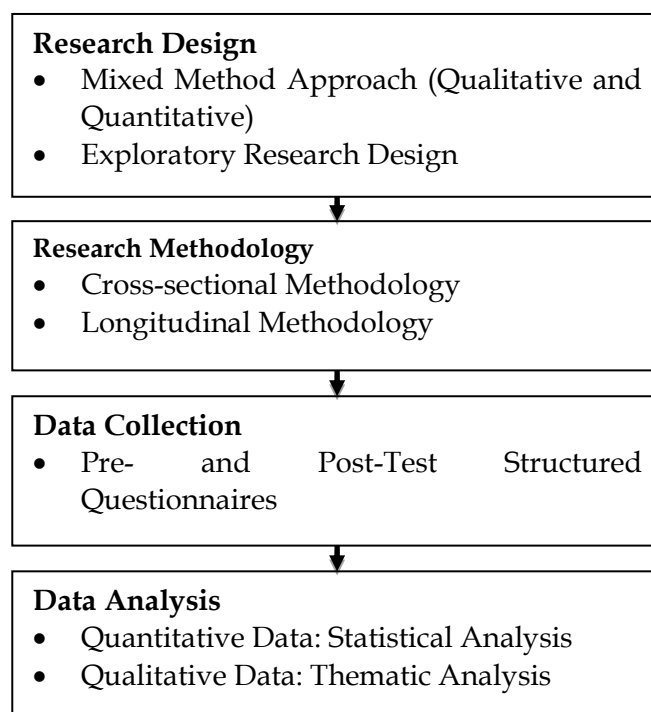


Figure 1. Research flow chart

Using consensus sampling, the sample included two groups of Human Resources Management (HRM) educators from a selected university in South Africa that took part in Design Thinking Workshops. The sample for group 1's pre-test questionnaire included 3 male and 3 female participants that were predominately of Black ethnicity. This group was aged between 30 and 59 years old and had 1 to more than 10 years of teaching experience. Group 2 included a total of 20 participants (14 male and 6 female), predominately of Black ethnicity, with participants aged between 18 and 69 years old, having less than 1 year to more than 10 years of teaching experience. The post-test sample for group 1 included 7 participants (4 male and 3 female)

predominantly of Black ethnicity, aged between 30 and 59 years old. Finally, the sample for group 2's post-test included 11 participants (7 males and 4 females), aged between 18 and 69 years old with 1-10 years of teaching experience.

Table 1. Participant demographics

Category	Description	Pre-Test		Post-test	
		Group 1 (N=6)	Group 2 (N=20)	Group 1 (N=7)	Group 2 (N=11)
Gender	Male	3	14	4	7
	Female	3	6	3	4
Age Range	18-29	0	4	0	2
	30-39	3	6	4	4
	40-49	2	5	2	2
	50-59	1	2	1	1
	60-69	0	2	0	2
	70+	0	0	0	0
Ethnic Group	Asian	0	0	0	0
	Black	5	17	6	10
	Coloured	0	0	0	0
	Indian	1	3	1	1
	White	0	0	0	0
Years of Experience	Less than 1 year	0	1	0	0
	1-3 years	1	7	2	5
	4-6 years	2	7	2	3
	7-10 years	2	2	2	3
	More than 10 years	1	3	1	0

At two different points in time, two distinct cohorts of participants' responses were collected, namely, educators from the Department of Human Resources from a selected university in KwaZulu-Natal, South Africa. Vogl (2023) asserts that longitudinal research possesses significant potential for examining continuity and change, and the integration of qualitative and quantitative longitudinal research within a mixed-methods framework facilitates the attainment of complementary, more valid, and nuanced conclusions. The first group of participants completed the pre-survey and post-survey in August 2024, while the second group of participants underwent the same process in November 2024. Designed to capture a comprehensive view of the participants, perceptions and the outcomes of the approach under study, a combination of qualitative and quantitative instruments was used. Prior to both workshops, a pre-survey was administered to both groups of participants. The pre-survey was primarily qualitative with some quantitative demographic information (QUALI+quan) that measured the participants' understanding of design thinking principles. The post-survey included both quantitative questions in a five-point Likert scale and the qualitative instrument design (QUAN+QUALI) included open-ended questions that measured the perceptions and the outcomes of the workshop. Data for both the pre- and post-survey instruments were collected via an online survey platform.

Numerical data were processed with Jamovi (version 6.2.11). Analysis involved descriptive statistics (frequencies, percentages) and inferential comparison via paired-sample t-tests. Textual responses from open-ended questions were examined using thematic analysis to identify recurrent patterns and insights.

Several techniques were used to guarantee the validity and trustworthiness of this study. The use of pre- and post-surveys ensured the internal validity of the study, while external validity was ensured with the integration of qualitative insights, with longitudinal data allowing for a more comprehensive and broadly applicable interpretation of the findings

(Zohrabi, 2013). The pre- and post-survey included standardized Likert-scale questions measuring participants' confidence and knowledge in various areas, including design thinking steps, implementation of design thinking, and workshop and facilitator engagement. For example, "I feel confident in using design thinking to solve workplace challenges" was evaluated from 1 = Strongly Disagree to 5 = Strongly Agree. In order to gather qualitative insights, open-ended questions like "What challenges do you foresee in applying design thinking?" were also included. Triangulation was used in this study to evaluate improvements in knowledge and preparedness to use design thinking by comparing pre- and post-survey data between the two groups (Group 1 and Group 2). By cross-validating the results from several metrics and data points, this method improves the validity of the findings and guarantees a thorough comprehension of the workshop's impact. Reliability was ensured with the standardized questions in both the pre- and post-survey instruments.

RESULTS AND DISCUSSION

The descriptive results of this study were divided into four sections, namely, participant demographics; pre-test results on participant design thinking understanding and knowledge; perceived impact of the design thinking workshop; impact of the design thinking workshop on module development; and perceptions on the immediate and long-term impact of the design thinking workshop. Inferential statistics were presented by comparing the pre-survey and post-survey data within the 2 groups under study.

Table 2. Pre-test responses on design thinking knowledge and application

Response option	Group 1 Frequency	Group 1 %	Group 2 frequency	Group 2 %
I have never heard of it	0	0%	7	41.18%
I have heard about it but do not know how to apply it	3	42.86%	7	41.18%
I have some basic understanding but find it complicated	2	28.57%	1	5.88%
I have a good understanding but have not applied it	2	28.57%	2	11.76%
I have applied it in my work and have some experience	0	0%	0	0%

As presented in Table 2, a higher proportion of respondents in Group 1 reported at least a foundational familiarity with design thinking (57.14%), in comparison to Group 2 with 47.06%. Interestingly, Group 2 was the only group where the respondents indicated that they had never heard of design thinking (41.18%). Furthermore, no respondents from both groups 1 and 2 indicated that they had applied it to their work and have experience (0%). In further analyzing the data from table 2 for insights on a possible pattern for why group 2 had significantly lower knowledge and understanding of design thinking, the study analyzed the demographic data of the participants. There were no clear patterns with regard to race, gender, and equally the years of experience. For those respondents that indicated they had never heard of design thinking, their years of experience ranged from 1-3 years to more than 10 years, indicating no clear pattern as to why this group's knowledge of design thinking was significantly lower. This would require further research.

Table 3. Perceived impact of design thinking workshop on participants

Question	Response option	Group 1 (N=7)		Group 2 (N=11)		Total (N=18)	
		Freq	%	Freq	%	Freq	%
How prepared do you feel to implement the design	Not at all prepared (1)	0	0%	0	0%	0	0%
	Slightly prepared (2)	0	0%	0	0%	0	0%
	Moderately prepared (3)	1	14%	4	36%	5	28%
	Very Well prepared (4)	4	57%	3	27%	7	39%

Question	Response option	Group 1 (N=7)		Group 2 (N=11)		Total (N=18)	
		Freq	%	Freq	%	Freq	%
thinking-aligned module you developed during the workshop?	Completely prepared (5)	2	29%	4	36%	6	33%
How useful was the exercise of applying design thinking to improve your selected module?	Not useful (1)	0	0%	0	0%	0	0%
	Slightly useful (2)	0	0%	0	0%	0	0%
	Moderately useful (3)	0	0%	1	10%	1	5%
	Useful (4)	1	14%	4	36%	5	28%
	Very useful (5)	6	86%	6	54%	12	67%
How likely are you to apply design thinking principles to other modules or areas of your work?	Very Unlikely (1)	0	0%	0	0%	0	0%
	Unlikely (2)	0	0%	0	0%	0	0%
	Neutral (3)	1	14%	1	10%	2	11%
	Likely (4)	3	43%	4	36%	7	39%
	Very Likely (5)	3	43%	6	54%	9	50%
Did the practical application help you better understand the design thinking process?	Yes	7	100%	11	100%	18	100%
	No	0	0%	0	0%	0	0%

Survey results demonstrated a strong overall sense of readiness, with most participants rating themselves as well or fully prepared to align their modules to design thinking. Group 1 had a higher and more consistent confidence level, with 86% saying they felt well and completely prepared. In contrast, Group 2 had a more polarized view of preparedness, with 36% indicating they were moderately prepared and 36% indicating they were completely prepared. One of the possible reasons for this finding is that group 1 had a significantly better baseline knowledge of design thinking prior to the workshop (table 2). While some authors agree (Lodge & Kennedy, 2015; Jaskyte, 2024) that prior knowledge can increase understanding and confidence, Brod (2021) and Hattan et al. (2024) argue that prior knowledge only aids in learning, and consideration for the activation of this knowledge should be considered.

Most Group 1 respondents (86%) found the usefulness of the exercise (using their own study guide) for applying design thinking to be very useful, while 54% of the group indicated that the exercise was very useful. Overall, a strong majority of the respondents (95%) found the exercise to be useful and very useful. A slightly different trend for the question "*How likely are you to apply design thinking principles to other modules or areas of your work?*" was revealed, with Group 2 indicating a higher percentage (54%) for very likely when compared to Group 1 with 43%. Overall, the findings indicated that most respondents (89%) would be likely and very likely to apply design thinking principles to their modules. Brod's (2021) research suggests that the activation of coherent prior knowledge is a critical factor in learning and perceptions of preparedness. The author's research suggests that Group 1's greater confidence and perceived greater usefulness of the exercises are likely due to the activation of coherent prior knowledge that allowed the group to connect more meaningfully with the exercise.

Additionally, the respondents unanimously agreed (100%) that the practical application of the use of study guides assisted them in better understanding the design thinking process. Practical application during the learning process is critical to understanding as well as developing metacognitive skills. According to Winch (2016) and Tooman et al. (2016), practical knowledge and reasoning, which manifests as skills or "knowing-how," is contextual and social

in nature. It can be implicit, reactive, or deliberative and is essential for decision-making, planning, and problem-solving. Metacognitive skills are linked to organizing and reviewing behavior, reflecting, thinking critically, and developing a positive attitude towards lifelong learning (Rivas, 2022; Anthony et al., 2024).

In further measuring the perceptions of the impact of the Design Thinking workshop, the qualitative data from both groups revealed several key themes around what changes the participants plan to make immediately, as well as the long-term impact the workshop had on their teaching practices.

Table 4. Impact of design thinking workshop on module development

Q. What immediate changes have you made or plan to make to your module based on this workshop?				
Theme	Group 1 frequency	Group 2 frequency	Examples from Group 1	Examples from Group 2
Redesigning Study Guide/ Outcomes	3	5	"Use the newly created module outcomes for semester 2". "Learning outcomes".	"Changes in my study guide". "Adjusting outcomes of my study guide." "Learning outcomes".
Adding Practical Elements	1	1	"Add a practical element to the learning outcomes".	"Based on insights from this workshop, I plan to incorporate more interactive, hands-on activities".
Interactive, Student-Centered Approaches	0	4	-	"Teach in a fun way and create more activities for my students". "Incorporate small group exercises to foster deeper engagement."
Improving Assessment Methods	0	2	-	"Relooking at assessments to find better assessment methods". "Help me think about how to teach and assess more effectively".
Empathy Towards Students	1	0	"I know that I will be more empathetic towards students and accommodate their needs wherever possible".	

The redesigning of the study guide and outcomes emerged as the most common theme, with 3 responses from Group 1 and 5 from Group 2. Furthermore, adding practical elements to the design of their modules was another theme. Group 2 revealed the theme of incorporating interactive student-centered approaches with 4 responses from this group, as well as improving assessment methods (2 responses). On the other hand, group 1 indicated that they would have more empathy for students.

Table 5. Perceptions on the long-term impact of the design thinking workshop on teaching practices

Q. What long-term impact do you anticipate this workshop will have on your teaching practices?				
Theme	Group 1 frequency	Group 2 frequency	Examples from Group 1	Examples from Group 2
Empathy Towards Students	2	2	"It will make me empathize more, find out from the students what works and doesn't work".	"Cater for all students". "Encouraging a more student-centred, flexible approach".

Q. What long-term impact do you anticipate this workshop will have on your teaching practices?				
Theme	Group 1 frequency	Group 2 frequency	Examples from Group 1	Examples from Group 2
Transforming Mindset	2	2	"Enhance student-centred approach and collaboration". "It has changed my mindset". "I will create better students, more critical problem solvers and better future leaders".	"To change the students' mindset and engage in class". "This experience has motivated me to incorporate more collaborative and experiential learning opportunities".
Incorporating Design Thinking Principles	0	3	-	"I've learned the value of integrating design thinking principles, such as empathy and iterative improvement".
Flexibility and Creativity	0	2	-	"Positive long-term impact as it will make my teaching quiet innovative and creative, while enabling me to think critically and objectively".
Improving Teaching Skills	1	0	"Will apply much better approach to my teaching skills".	-

The most common theme for the question on the long-term impact of the workshop on the participants' teaching practices was empathy towards students and transforming their mindsets (2 responses from groups 1 and 2, respectively). Group 2 had a reoccurring theme (3 responses) for incorporating design thinking principles and incorporating flexibility and creativity (2 responses). Group 1 reveals an additional theme of the long-term impact of the workshop being to improve teaching skills. Research by Noh and Karim (2021) highlights the importance of a mindset change and, equally, the critical role of human-centeredness and empathy as one of the seven dimensions of the design thinking mindset in education. This is further supported by Newston et al. (2024) and Avsec (2022), whose research supports the impact of "human-centeredness" and empathy as central to encouraging mindset changes.

While outside the realm of design thinking, research by Mohamed et al. (2024) demonstrated a significant positive correlation between teachers' professional development attitudes and student performance, as well as between teachers' knowledge development and student performance. These findings, together with research by Yalçın & Özgenel (2023), indicate a strong argument on the importance of professional development, with the findings of this study emphasizing the importance of design thinking within continuous professional development.

Table 6. Impact of design thinking workshop – pre-survey and post-survey comparison

Survey description	Group 1		Group 2	
	Mean	Mode	Mean	Mode
Pre-Survey Mean (Knowledge)	2.66	2 ^b	1.80	1 ^a
Post-Survey Mean (Preparedness)	4.14	4 ^c	4	5 ^d , 4 ^c
Post-Survey Mean (Usefulness)	4.85	5 ^e	4.45	5 ^e
Post-Survey Mean (Likelihood to Apply)	4.28	5 ^d , 4 ^c	4.45	5 ^d

^a Never heard of it

^b Heard about it but do not know how to apply it

^c Very Well prepared

^d Completely prepared

^e Very useful

^f Likely

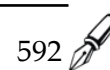
^g Very likely

Table 6 above presents the inferential statistics when comparing the participants' knowledge of design thinking prior to the survey with the post-survey perceptions. Group 1 had a moderate understanding of design thinking prior to the workshop (mean=2.66) and post workshop rated their preparedness, usefulness, and likelihood to apply design thinking with means ranging from 4.14 to 4.85. The mean pre-workshop was 1.80 for Group 2, and the group indicated a mean ranging from 4 to 4.45 post-workshop for preparedness, usefulness, and likelihood to apply. Based on these findings, both groups indicated a significant improvement in knowledge gained post the Design Thinking workshop. Supported by the findings from a study by Retna (2015), resources such as workshops and training must be provided to develop the appropriate mindset needed for design thinking, as well as university management considering curricula redesign and modification. Furthermore, the practicality of the workshop format improves problem-solving, decision-making, and planning, as well as metacognitive skills such as reflection and critical thinking (Rivas, 2022; Nobutoshi, 2023). These skills are essential if educators are going to be able to adapt design thinking to changes both in the classroom and in the module design to the expectations and required skills of an ever-changing modern world of work.

In the fast-paced and ever-changing world of today, having advanced reasoning and problem-solving skills has become critical for success. Students going into the working world need these skills for the variety of opportunities and challenges. Seevaratnam et al. (2023) posit that the lifelong skills in the design thinking process develop those necessary skills for 21st-century graduates. As a result, incorporating design thinking into the curricula has become a fundamental component of contemporary education, enhancing fundamental communication abilities with creative and analytical methods. However, educators must first not only comprehend but also embrace design thinking in order to properly teach students these skills (Eklund et al., 2022; Bender-Salazar, 2023). Essentially, educators have become the gatekeepers of these important skills as custodians of the curricula. Because of this, teaching educators design thinking is not just a useful addition but fundamentally a basic requirement. Such training ought to be included as a crucial component of educators' ongoing professional development rather than being a superficial "box-ticking exercise" by the university.

With design thinking, educators can assist students in developing creativity, adaptability, and critical thinking skills that are essential in the global economy. Institutions must ensure that educators are equipped to incorporate design thinking into their curricula and lessons by coordinating workshops that not only assist the educators with the application of design thinking but also change their mindsets to achieve continuous professional development. This study shows that an active learning format for design thinking training significantly improved the participants' preparedness to implement their design thinking module in class, with all participants in the study agreeing that the practical application helped them better understand the process.

Furthermore, the unique format of the workshop that included participants working on their own study guides during the workshop was indicated as being very useful by the participants and made them feel very confident to apply these principles to other modules or areas of work. These findings indicate that not only was knowledge gained, but they also indicate a mindset change and indicate that professional development amongst the participants would continue, as found in supporting research by Retna (2015), Nobutoshi (2023), and Dadswell (2024).



Additionally, the study uncovered the participants' perceived immediate and long-term impact of the workshop. The responses on the immediate changes indicated that redesigning the study guide and integrating student-centered approaches were achieved. These responses on the immediate changes provided evidence of the workshop's relevance and practicality and equally tangible outcomes. The long-term impact indicated a trend towards metacognitive impact, with the respondents indicating higher levels of empathy and a positive shift in mindset to design thinking. The long-term impact provided evidence of the depth of the training that will go beyond implementation and towards continuous professional development. Extensive studies by Shaha et al. (2015), Mohamed et al. (2024), and Phillips (2016) have revealed the significant impact that professional development of educators has on student performance and success, confirming the position of this study that training needs to be impactful in order for it to change educators' mindsets and skills, which in turn impact professional development, both long and short term.

CONCLUSION

A central outcome of this research is the marked enhancement in participants' readiness and grasp of design thinking principles, attributable to the workshop's applied nature to incorporate design thinking into teaching and methods and curricula redesign because of the practical and hands-on approach to the workshop and training. Working directly on study guides was part of the workshop's unique format, and the findings indicated that this format had a direct impact on both the short- and long-term impact on the participants. The implications of these findings are centered around these short-term impacts of the study guide redesign and student-centered approaches and the long-term impact of deeper understanding and metacognitive shift, marked with increased empathy for students and a mindset change.

Future research should consider the impact of group size on design thinking-focused professional development workshops. An interesting observation in the study was that in certain situations, the smaller group (Group 1) had a more positive opinion of the workshop outcomes than the larger group (Group 2), indicating that group dynamics may be a major factor in the results of these workshops. It would also be beneficial to investigate how educators' perspectives differ depending on whether they are teaching undergraduate versus postgraduate students. Understanding how these factors impact the training experience could provide insights into better customizing professional development workshops to match the needs of the participants, especially considering the notable changes in teaching dynamics between these two levels. Furthermore, it must be noted that the study did have limitations with sample size, scope, and demographic representation. To enhance the generalizability of the findings, future research should include educators from other departments and universities and include a more diverse sample to better reflect the demographic profile of the broader educator population.

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Author (s):

* Yâchal du Plessis (Corresponding Author)

Departement Applied Management Program, Faculty of Management Science,



Durban University of Technology,
41/43 M L Sultan Rd, Greyville, Durban, 4001, South Africa
Email: yachald@dut.ac.za
