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Research Paper

A Personalised Learning Platform with Text Generation, Games, and Chatbots for Mastering Business Administration Concepts

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ABSTRACT

Globally, personalised learning platforms (PLPs) are increasing in significance and usage, making them today's most preferred tools to offer tailored learning experiences. Artificial Intelligence (AI) has turned personalised learning into a powerful learning force, thus helping to catalyse the customization and adaptation of learning methods and content to maximize learning outcomes. This study aims to assess the role of PLPs in driving the skills development of small firms in South Africa. The design research science (DSR) method was used to guide the conceptualization, design, and evaluation of the Bus-Ad-Coach Personal Learning Platform (BA-PLP). The platform was developed with four aims in mind, i.e., (a) to champion the personalisation and adaptation of business education content and methodologies, (b) to drive the embedment of real-time feedback and self-assessment of learners, (c) to guarantee seamless access to business education, and (d) to make learning a captivating and rewarding experience. The prototype was evaluated to gauge its usability, functionality, and performance in a real-world context. Seventy-one (71) first-time prototype users took part in its evaluation using a structured tool. Out of the 426 responses collected from 71 users, 200 responses (46,9%) strongly approved of the platform's features and acknowledged its educational and informational effect, and 41% enormously appreciated the relevance of its educational content. The study found that recent endeavours to uniquely blend game mechanics, chatbots and AI-generated texts into the PLP mix can make the knowledge acquisition journey an extremely customised, reflective, and captivating experience. The findings of this study revealed that personalised learning platforms are an indispensable element in the training processes of small businesses. T

INTRODUCTION

The fact that a significant portion of small businesses in South Africa lack sufficient mastery of critical business concepts is not only accepted but is also considered the sector's most serious problem (Almeida et al., 2012; Hanushek et al., 2015). This sad fact is further echoed by Bushe (2019), who identified inept business acumen as one of the top three reasons why small businesses in South Africa die within the first five years of formation.

This grim reality has four implications for existing business education ecosystems: (a) it exerts pressure on interventionists to place business concept mastery at the apex of their intervention mix (Adam & Alarifi, 2021), (b) it underlines the importance of maximizing the pedagogical dividend of current business concept- mastery programmes (Bushe, 2019), (c) it highlights the need to reset ineffective business concept-mastery methodologies and tools to increase their pedagogical impact (Adam & Alarifi, 2021), and lastly, (d) it provides a compelling case to tap into vast business concept-mastery teachings and resources linked to AI-aided tutorials (Canhoto & Fintan, 2019).

Thus, this study addresses two overarching concerns, i.e., (a) the inept mastery of business administration concepts by small businesses in South Africa and (b) the absence of remotely accessible PLPs offering tailored business concept-mastery teachings dedicated to small businesses. Unlike their counterparts in Europe, the USA and China, small businesses in South Africa do not enjoy seamless access to AI-generated business education tutorials, which remains a compounding factor (Canhoto and Clear, 2019).

Canhoto and Clear (2019) reiterate that by adopting AI-enabled tutorials on digital platforms, small businesses can seamlessly access business education anytime and anywhere and at a minimum cost, thus guaranteeing the greater personalisation, adaptation and accessibility of critical business education. What makes this study's contribution to the body of knowledge immense is not only its ability to explore and harness the nexus of AI-backed chatbots, text generation and game mechanics but

also its insistence on the need to promote the design, amplification and subsequent embedment of personalised business concept-mastery education in the current small business education curriculum.

Against this backdrop, the rigour and rationality of the design science method were utilised to weave a localised business concept-mastery platform, with tutorials dedicated to small businesses. What makes the platform unique and different is its ability to harness the nexus of AI-powered chatbots, text generators and game mechanics to deliver an exceptionally engaging learning experience. With its wide-ranging business education content that covers a wide array of sought-after topics, the platform has been rated by many users as a rich reservoir or library of vital business education tutorials.

Consequently, two subject matter experts thoroughly screened the content to maximise its relevance, small business-centricity and pedagogical value. Moreover, the efficacy of the platform's prototype was subsequently evaluated to gauge its usability and functionality before it was launched on a large scale. A total of 71 out of the earmarked 100 users took part in the evaluation exercise. This evaluation was premised on the following probing questions:

RQ1: What is the role of PLPs in driving the skills development of small firms in South Africa?
RQ2: What are the key components of an effective PLP?
RQ3: What suggestions can be implemented to improve the functionality of the Bus-Ad-Coach Personal Learning Platform (BA-PLP)?

To answer the questions and to further elucidate whether the nexus of chatbots, AI-generated texts and game mechanics can be maximally harnessed to deliver an extremely personalised business education experience, some of the crosscutting perspectives of leading researchers are discussed below.

LITERATURE REVIEW

Demystifying personalised learning

Personalised learning, a widely used paradigm to enrich and advance tailored learning experiences, is an old-age phenomenon traditionally rooted in education and marketing (Ouyang & Jiao, 2021). Its originators had the learner's unique needs at heart, hence the term 'personalised learning' (Newton & Miah, 2017). Since each learner's knowledge realms and intellectual acumen are unique and imitable, a pragmatic learner can unleash matchless knowledge acquisition exploits only if the learning encounter is learner-directed and driven (Murtaza et al., 2022). It is a total departure from the one-size-fits-all approach to learning (Fariani et al., 2022).

Thus, a good learning activity must strive to stimulate and deepen an individual learner's cognitive convictions and knowledge application encounters (Nafea et al., 2019). According to Fariani et al. (2022), the ultimate goal is to maximise each learner's learning journey to make them more intriguing and fascinating while simultaneously upscaling their intellectual impact and substance. This explains why, in this increasingly virtualized business world, the concept of personalised learning platforms is reportedly winning the hearts and minds of digitally savvy learners (Fariani et al., 2022).

Three of the traits that distinguish it from other learning mediums are cemented in literature, i.e., (a) its remarkable ability to customize the learning transaction to suit each learner's unique tastes (Chen & Wan, 2020), (b) its exceptional ability to adapt content and learning schedule to an individual learners' unique circumstances; this gives it matchless flexibility advantages (Nadan et al., 2023), and (c) and its extraordinary ability to stimulate active learner engagement as well as its ability to deliver the most refined and simplified learning content (Rukadikar & Khandelwal, 2023).

Evolution of Personalised Learning

Meanwhile, Chen and Wan (2020) report that the rapid evolution of the personalized learning paradigm began only in the early 1990s when personalized learning became a global sensation. As Dwivedi et al. (2021) noted, with the advent of AI technologies in the early 2000s, the paradigm underwent a full-cycle metamorphosis to incorporate AI-engineered learning enhancements and mechanics. In concurrence, Nadan et al. (2023) asserts that its use as a medium for transmitting new insights and knowledge remarkably increased in significance and frequency during the early stages of the 4th Industrial Revolution.

AI has unleashed a new generation of personalized learning mechanics that personal remotely controlled tutors and game features to achieve seamless feedback, rapport, and entertainment (Rukadikar & Khandelwal, 2023). By using intelligent knowledge transmitters and robot-controlled teachers and by spicing it with captivating games and remote-controlled competence assessment features, the idea is to make learning a learner-centric and eye-opening encounter.

Lately, Murtaza et al. (2022) observed that, since the advent of digitization, the automatization and virtualization of learning to personal personalized learning experiences are being taken to new heights. As supported by Newton and Miah (2017), also

echoed by Dwivedi et al. (2021), digitization is lauded for combining the precision of AI-powered text generation mechanics with chatbots to make learning a highly engaging enterprise.

As Lee and Lee (2021) put it,

> "*Adding a thrilling game into the mix makes the learning encounter look like a captivating movie thriller".*

Rukadikar and Khandelwal (2023) are convinced that personalized learning platforms built on the bedrock of AI tutors and chatbot mechanics are personalized learning how knowledge is accessed, dispensed, and embedded in the brains of digitally savvy learners. Another tool that can be blended into personalized learning platforms is AI-powered text generation, which helps learners demystify and master essential concepts and critical terms, making learning practically collaborative and stimulating (Lee & Lee, 2021).

Literature is awash with examples where personalized learning was merged with chatbots, text generation and game mechanics to produce astonishing and memorable learning transactions (Ouyang & Jiao, 2021; Rukadikar & Khandelwal, 2023; Dwivedi et al., 2021). Thanks to these breathtaking innovations, platform-based personalized learning is transforming today's learning landscape into a hub of learning innovation and an edu-entertainment haven (Upadhyay & Khandelwal, 2018).

Fusion of text generation, chatbots and game mechanics into PLPs

PLP innovation peaked the moment ingredients such as text generation, chatbots and game mechanics were fused into the recipe (Rukadikar & Khandelwal, 2023). These made interacting with PLPs an exciting experience. The synthesis of the literature study shows that blending text generation, chatbots and games into platform-engineered learning portals has perfected personalised learning experiences for students and skill-starved small firms. Advancements in PLPs have successfully ushered in adaptive learning experiences, high-calibre tutoring sensors, and data-driven insights.

As Thai et al. (2021) noted, these are emerging as an integral part of the new generation of virtual classrooms. The benefits accruing to learners from PLPs are endless, i.e., learners benefit from customised content transmission (Upadhyay & Khandelwal, 2018), seamless feedback and rapport (Rukadikar & Khandelwal, 2023), and real-time engagement (Dwivedi et al., 2021). Furthermore, AI-powered text generation mechanics can eliminate educational disparities, drive inclusivity, and leverage learning outcomes for diverse groups of learners (Thai et al., 2021).

PLPs aim to cater to individual learners' distinct needs and learning styles, offering them customised content, thereby allowing them to absorb knowledge at their own pace and frequency (Thai et al., 2021). What makes chatbots a centrepiece in driving personalised learning experiences is their ability to break down voluminous amounts of data and synthesize them into absorbable and transferable packets of knowledge while simultaneously accelerating the pace of the learning activity (He et al., 2024). In recent times, chatbots have increasingly become the coalface of personalised learning. By throwing text generation automatics into the mix, the idea is to enrich the vocabulary of learners and their ability to conceptualise essential terms and subject matter concepts (Rukadikar & Khandelwal, 2023).

Various studies have highlighted the effectiveness of adaptive learning platforms in increasing the pedagogical value and impact of the learning experience. For example, according to Nadan et al. (2023), the emergence of real-time chatbot systems has doubled the engagement experiences of learners, thereby leading to a tenfold increase in learner performance. PLPs have gained prominence because they produce astounding learning outcomes when seamlessly integrated with AI-driven learning management systems, chatbots, text generation and virtual tutors. In doing so, these tools can assist both learners and facilitators in many ways, i.e., they can help to automate the administrative side of learning (Lee & Lee, 2021), freeing up facilitators to focus on other equally critical interventions (Rukadikar & Khandelwal, 2023).

Most importantly, Nadan et al. (2023) argue that learners benefit from the 24/7 support from chatbots and virtual tutors, helping them answer educational puzzles in real time. By housing text generation mechanics, high-speed chatbot pathways and captivating game mechanics on a single learning platform, various benefits can be achieved, i.e., enhanced learner engagement (Lee & Lee, 2021), improved learner retention rates (Thai et al., 2021)., and efficient use of facilitators' time (He et al., 2024). Moreover, Nadan et al. (2023) contends that PLPs can address the historic challenge of skill inequality by offering customised learning solutions to a group of learners with composite learning needs.

Weak Links of PLPs

However, it is essential to note that PLPs are not without their potential dark side (Nadan et al., 2023). For example, PLPs create the need for protection from data privacy risks (Rukadikar & Khandelwal, 2023) as well as measures to bridge the digital divide caused by costly data tariffs (Rukadikar & Khandelwal, 2023), specialised smartphones (Ouyang & Jiao, 2021), and poor network coverage in rural areas (Lee & Lee, 2021). Most importantly, the need to mitigate biases linked to AI algorithms cannot be overstated (Ouyang & Jiao, 2021). Ethical concerns relating to technology addiction must also be mitigated (McLaren & Nguyen, 2023).

Moreover, there is a need to reimagine existing PLP mechanics to reposition them for new pedagogical realities and best practices. This may go a long way towards enhancing their learner-centricity and pedagogical value. In terms of new knowledge, this paper contributes to the growing body of knowledge on PLPs by providing a broad analysis of the discipline and alerting key players in the local skill ecosystem to some critical factors to consider when driving platform-based personalised systems.

UNDERPINNING THEORIES

The study is grounded on four crosslinked theories: **the collaborative learning theory**, **the constructivism learning theory, the connectivism theory**, and **the humanist theory**. Whereas the collaborative learning theory holds that, for a learning transaction to deliver maximum educational impact and pedagogical value, mutually reinforcing synergies among learners must be optimised (Arievitch, 2020), the constructivism learning theory holds that the learning effort can achieve tremendous outcomes only if the learner is placed at the centre of the learning transaction, implying the need to systematically drive a learner-centred learning experience. Newton (2015) defines constructivism as 'an approach to learning that holds that people actively construct or make their knowledge and that the experiences of the learner determine reality'. In other words, any learning journey that does not take to heart a learner's unique educational needs and social context may not be worth the expense and effort (Ariel et al., 2020).

Some of the benefits accruing to learners engaged in a collaborative learning realm are inter-alia, (a) maximise their problem-solving aptitude, and (b) improving their shared understanding of meanings and concepts and driving a shared sense of achievement whilst simultaneously fostering mutually rewarding interpersonal relationships, leading to higher social competence and self-esteem (Scager et al., 2016). In terms of constructivism learning theory, making learners the front and centre of the learning experience gives them a great sense of control over the learning activity, thereby boosting their morale and self-esteem (Arievitch, 2020).
The connectivism theory denotes the need to create mutually reinforcing connections between the learner and the educator, which is almost a replica of personal learning (PL). It also seeks to amplify and legitimise the learner's voice (Kergel & Heidkamp, 2017).

Some of the theoretical constructs of the PL have their origins in the humanist theory, especially those that seek to give a learner a dignified learning journey (Dale & Hyslop-Margison, 2010). Thus, the common denominator in all four theories is that they offer the tutor free rein to tailor the training effort to each learner's unique learning styles, thereby deepening tailored learning exchanges (Graf et al., 2009). This study's methodological roots and theoretical direction are similar to the arguments pitched by the constructivist theory because, unlike the other three theories, it presents concrete arguments in favour of learner-tailored learning.

DESIGN SCIENCE RESEARCH METHODOLOGY

The study used imaginative design ideas to chart a new era in small business education and training. Novel and unimaginable solutions or artefacts to real-life problems that hold back human progress must be carefully ideated, conceptualised, designed and efficacy-tested through a process encompassing many stages and a rigorous quality assurance exercise. In solution design thinking, this process is called design science research (DSR) (Venable et al., 2016). In its ideal form, DSR is primarily helpful in solution-design contexts that require multipoint scientific tasks to produce defect-free artefacts – and artefacts that are systemically customised to match explicitly and uniquely defined user specifications, preferences, and tastes. (Johannesson & Perjons 2014).

Thus, DSR is a research approach that underscores the need for solution creators to employ the rigour, precision and integrity of scientific processes and procedures to authenticate a solution's engineering potency, functionality, and performance (Dishman, 2003; Corrigan, 1986). As Hevner et al. (2004) observed, the idea is to recommend a tried-and-tested solution that systemically creates, appropriates, and delivers breathtaking user value and appeal. In a nutshell, the desired artefact must be designed with the user's specifications and unique social context in mind, meaning that DSR is purely a user-centred solution design effort.

In the view of Hevner et al. (2004), DSR is two things, i.e., the detection of real-world problems and then applying a systemic scientific process to innovatively imagine and design a novel solution to address the problem – but also ensuring that the solution is tested for efficacy and functionality before it is launched on a massive scale. Those efficacy and functionality test results must be communicated to stakeholders to build public confidence and trust.

Thus, the starting point in conducting DSR is to recognise that the status quo needs to be reset or recalibrated to pave the way for a better future or solution (Dishman, 2003; Eagleton, 2011). DSR enjoins the creators of solutions to identify a practical problem in the form of a knowledge gap, an unmet need, or an unexplained life riddle or mystery. This practical problem is then diagnosed to better understand its deep-seated underpinnings. In this study, the problem at the centre of the DSR relates to the lack of a home-grown PLP that business owners/managers suffering from a chronic scarcity of business administration skills need to leverage for their personal development and the firm's performance.

A five-point process of DSR was followed to ideate, brainstorm, screen, design and evaluate the functionality of the PLP. The key differentiators of the envisaged PLP are (a) its remarkable ability to utilise fascinating game mechanics to keep learners maximally captivated and enthralled, (b) a versatile text generation AI device to bolster learners' mastery of business administration language, and (c) spiced with an inbuilt chatbot to foster real-time directional exchanges. All three features were uniquely combined to produce a holistic learning experience. To give it a more contextual and grounded meaning, the DSR was engrossed in what Goodyear (2005) termed educational design science (EDS). EDS is defined by Van Den Akker (2007) as a sub-paradigm of DSR that seeks to design, develop, and evaluate a learning program or process to maximise its pedagogical relevance and value.

Five crucial phases that marked the design process included inter-alia: (a) gaining a holistic understanding of the problem of interest (Watson et al., 2010); (b) identifying and precisely defining the engineering attributes of a plausible solution (Vom Brocke et al., 2013), (c) sculpting a solution in prototype format (Vom Brocke et al., 2020), (d) pilot-testing the efficacy and functionality of the prototype using real-world assumptions (Gregor & Hevner 2013); and (e) refining or finetuning the prototype to incorporate new reflections generated from the piloting exercise (Kuechler & Vaishnavi, 2008). To this end, a clear framework was developed to guide the processes that define the DSR roadmap. The framework used in this instance was similar to that used by Johannesson and Perjons (2014) because it was considered simple, encompassing, and easy to follow.

It is important to note that this study is not the first to utilise an educational-oriented DSR. For example, Oyelere et al. (2016) also used a similar approach to design, develop, and evaluate a mobile learning application for computing education for high schools in Nigeria. The framework used, which this study gladly adopted, comprised five activities, namely (a) illustrate the problem, (b) outline the artifact and define its specifications, (c) design and develop the artifact, (d) demonstrate the artifact and, finally, (e) evaluate the artifact. The only difference between the framework adopted by Oyelere et al. (2016) and the one used in this instance is that the communication of evaluation results was added as the sixth activity of the DSR. As convincingly argued by Johannesson and Perjons (2014), the inclusion of the communication construct is a phenomenon that is consistent with widely practiced DSR traditions.

Considering this, the following paragraphs provide details on how key DSR processes were systematically engaged to construct and pilot-test an AI-aided PLP that utilizes the confluence of three highly interactive AI ingredients (chatbots, games and text generators) to design a virtual business education tutor named the BA-PLP.

BUS-AD-COACH PERSONALISED LEARNING PLATFORM (BA-PLP)

As discussed earlier, the BA-PLP artifact, which became the subject of pilot-testing, was a by-product of the four intertwined DSR phases highlighted above. The artifact's ideation, conceptualization, ultimate design and testing were predicated on four compelling arguments and idealistic assumptions, i.e., (a) the realization that AI-controlled learning encounters are fast gaining traction and momentum across the globe (Ouyang & Jiao, 2021), especially since the advent of digital technologies (Rukadikar & Khandelwal, 2023), (b) the pressure to maximise the participation parity of small businesses in an increasingly digitised skilling space (Feuerriegel et al., 2024), (c) the ambitious move to make business education remotely accessible in real-time and at a minimum interface cost (Brynjolfsson et al., 2023), and (d) the strong desire to drive greater personalisation and customization of learning experiences in the small business sector (Epstein et al., 2023).

To sum up, the construction of the BA-PLP clearly reaffirmed the evolutionary and dynamic nature of today's fluid business-education landscape. Ouyang and Jiao (2021) echoed this thinking when they predicted that business education underwent revolutionary changes since the dawn of AI-aided virtual tutors in the early 2000s. Consequently, the way business knowledge is being constructed, packaged and transmitted has significantly metamorphosed (Manjulalayam, 2023).

Thus, the BA-PLP idea was framed with two goals in mind, i.e., to break the cycle of digital hesitancy and to speed up the digital transformation journey of small businesses and to deliver extremely interactive and engaging tutorial experiences by harnessing the nexus of chatbots, text generators and game mechanics (Rukadikar& Khandelwal, 2023).

Consequently, the BA-PLP tool is a digitized learning pathway that is deliberately created to offer an individual learner a tailored and personalised learning encounter. Given South Africa's documented history of skill scarcity and digital hesitancy, especially in the small business space, the overarching goal of the BA-PLP was to, among other tasks, enrich the business administration acumen of users encountering difficulties in participating in contact learning programmes; the placement of learners at the heart of the learning transaction; and the disengagement from business education programmes predicated on contact learning ecosystems.

The core features of the BA-PLP are uniquely blended chatbots, text generators, and game mechanics (a quiz game) to guarantee a collaborative and holistic learning experience. The chatbot was instrumental in utilising the natural language processing (NLP) program to mimic human interactions (and, in the process, to offer concise answers to users' pertinent questions), while text generators guaranteed seamless access to personalised business education content, thus helping the users to improve their mastery

of essential business administration language and concepts, and the quiz game aroused the users' interest in the learning encounter (Nicolas, 2022). Figure 1 below depicts the introductory page of the Bus-Ad-Coach (BA-PLP).

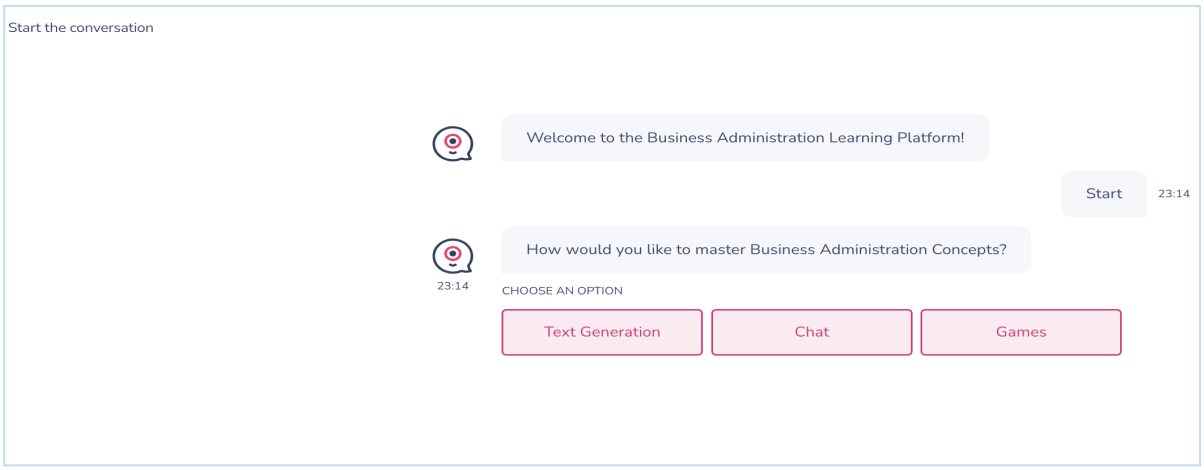

Figure 1. Bus-Ad-Coach Personal Learning Platform (BA-PLP) intro page

The benefits that accrue to the BA-PLP users are countless: (a) users enjoy seamless access to the platform anytime, anywhere and at low cost, (b) it mixes learning with fun, making the learning transaction a thrilling and captivating experience (Feuerriegel et al 2024), (c) users access a large reservoir of tailored and relevant business education content (Zlatarov et al., 2021), (d) users receive coded feedback and rapport in real time (Zhang & Aslan, 2021) and, lastly, (e) users can freely generate and download compliance documents like HR policies, or a business plan and financial statements templates with the aid of a text generator device (Vlasova et al., 2019). Most importantly, as Pedro et al. (2019) alluded to, the BA-PLP is lauded for underscoring learner-centred content, customised pacing, and matchless flexibility.

What is clear from the arguments above is that the BA-PLP tool will make it easier to intensify personalised learning and make training a powerful, engaging force (Vlasova et al., 2019). Thus, the real strength of the BA-PLP lies in its ability to blend chatbots, text generators and game mechanics (in this case, a quiz game) to form a hybrid learning tool that makes it possible for users to reap the benefits of all technologies. The three elements are co-joined in such a way that they complement each other and, in the process, create a seamless learning environment where every learner can blossom and thrive (Kaluarachchi et al., 2021). Interlocking these features to form an interactive learning concoction gives learners an opportunity to focus more on what they do best – learning – whilst the three elements provide the nuances of personalization (Elfeky, 2018). The final product is an extremely engaging, captivating, and customised learning experience.

This study pilot-tested the BA-PLP prototype by tracing the lived experiences of purposively sampled end-users. The ultimate aim remained to launch the platform on a large scale once the pilot test results proved bankability. Figure 2 below unpacks the steps followed to develop the prototype in line with DSR.

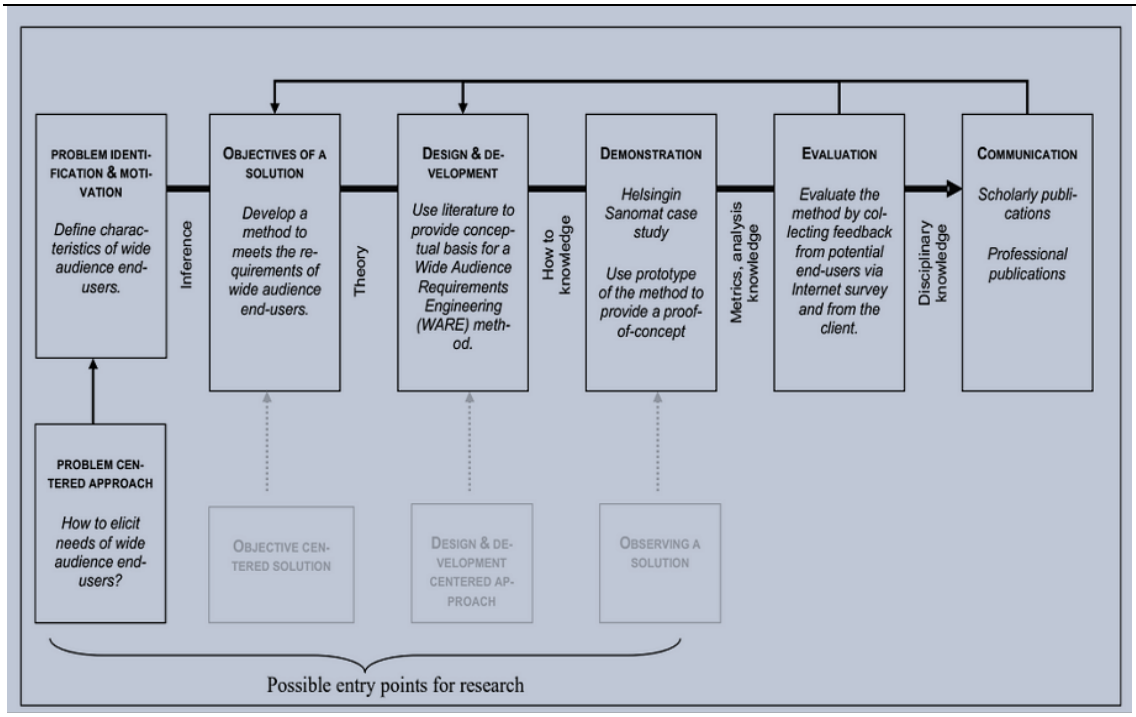

Figure 2. Design Science Research (DSR) (Johannesson and Perjons, 2014)

The following paragraphs elaborate on the steps and stages illustrated in Figure 2 and how they were utilised by this study:

Explicate the problem: A problem can be either a knowledge gap or an unfulfilled need (Järvinen, 2007). In this case, the study's overarching concern was to construct an AI-enabled PLP that combines the exploits of (a) text generators to improve a learner's business language mastery, (b) quiz game mechanics to improve reflective learning experiences, and (c) a chatbot to drive bi-directional automated exchanges in real-time.

Outline artifact and define requirement: Built with a learner's distinct learning styles, needs, attitudes and behaviours in mind, the BA-PLP seeks to, among other things, maximise tailored learning experiences (Cole et al., 2005), upscale engagement rates (Peffers & Tuunanen, 2005), drive optimal learner interest (Peffers et al., 2003), and automate learner performance tracking and assessment (Preston & Mehandjiev, 2004).

The PLP is distinguishable by six uniquely blended features, i.e., (a) highly interactive and intelligent virtual tutors predicated on chatbots, quiz games and text generators (Vlasova, et al., 2019), (b) holistic business administration content that is benchmarked with international standards (Feuerriegel et al., 2024), (c) a high-precision chatbot portal to facilitate a highly engaging and interactive learning environment (Pedro et al., 2019), (d) AI-engineered text generation to boost each learner's mastery of business concepts and language (Zlatarov et al., 2021), (e) mind-blowing game mechanics to keep learners engrossed and entertained (Rukadikar & Khandelwal, 2023), and (f) learner performance tracking devices that measure performance using appropriate metrics (Vlasova et al., 2019).

Design and develop artifact: Once the conceptualization of the BA-PLP was finalized, a team of software engineers with an impeccable record in designing similar artifacts worked in conjunction with the author to design and develop the prototype. The work of the team was guided by the detailed engineering specifications framed by the author. As per Peffers et al. (2003) suggestion, these specifications set out the prototype's core features and attributes, details on user needs, functionality, and performance expectations.

Demonstrate the Artifact: Peffers and Tuunanen (2005) maintain that it is common practice in DSR traditions to subject the prototype to a series of laboratory demonstrations, with two objectives in mind: (a) to validate its technical efficacy and engineering resilience (Cole et al., 2005), and (b) to gauge its compatibility with user needs and the exogenous environment (Peffers et al., 2003). Considering this, a deliberate decision was made to conduct a detailed laboratory test on the efficacy of the BA-PLP. Through this demonstration, two problematic areas of learning were identified, i.e., (a) the content was considered not comprehensive enough to cover all business topics of interest to small businesses, and (b) the processing speed of the platform was not as fast as anticipated.

Evaluate the artifact: Considered one of the cornerstones of the DSR process, the artifact evaluation task is usually carried out to determine whether a novel solution adequately addresses the problem at hand or whether it fulfils its desired objective (Niederman et al., 2012). To this end, evaluating the BA-PLP involved sampling the experiences and views of 71 prototype users

drawn mainly from South Africa's Gauteng province. The over-representation of participants from Gauteng is because it is the country's most populous industrial and commercial hub and has a high concentration of small business activities.

As Creswell (2018) suggested, purposive sampling was preferred; the aim was to allow small businesses with poor mastery of business concepts to be chosen. Moreover, the User Experience (UX) survey was conducted with the aid of a structured tool because, as reasoned by Leedy and Ormrod (2018) and echoed by Creswell (2018), unlike other types of survey tools, **it is the only tool that allows a researcher to systematically pose** a set of standardized questions using a precisely thought-out framework. The tool was accessed via a Google link to enable fast access and real-time responses (Yin, 2016).

To be specific, seven questions were posed, and, on average, each user spent a minimum of 10 minutes to answer the questions. The data was later cleaned up and sorted into intelligent codes before being organised into crosslinked themes for analysis. A report was then compiled and subjected to a rigorous quality assurance process to enhance its credibility and trustworthiness. Two forms of validation were employed: firstly, content validation, which was achieved by subjecting the draft report to a peer review process. To that effect, a renowned Professor with impeccable experience in the field content-reviewed the draft report. Secondly and most importantly, all research materials were verified to improve the authenticity of the facts that informed the study (Goldkuhl, 2013).

Communicate the results: Takeda et al. (1990) posit that sharing the results of the evaluation must not only be an integral and natural part of the DSR mix but also be shared with the right audience using the right mix of media channels. Thus, the results of the evaluation were subsequently shared with key stakeholders as part of an elaborate plan to drum up stakeholder support and widen the PLP's appeal, reach and usage, especially among the participating small firms. While this section discusses the conceptual framework that sets the methodological direction of the study, a detailed summary of the study's notable findings and culminating discussions are discussed in the next section.

RESULTS AND DISCUSSIONS

The research draws a sharp focus on the pedagogical value and contribution of AI-enabled PLPs using small businesses in South Africa as a point of reference. In today's fluid operating environment characterized by fast-paced digital technologies, small businesses curious to master business concepts are under pressure to embrace AI-enabled virtual tutors. Thus, the study was inspired by two trigger points: (a) the inept mastery of business language and concepts by small businesses, and (b) the lack of appetite by small businesses to tap into vast learning resources offered by AI-aided virtual tutors.

The study was founded on the notion that, like any other discipline, business administration is an art or science transacted using unique language codes and terminologies. This discovery underscores the need to intensify research-led efforts to reposition small businesses for an AI-led skill revolution. In concurrence, the OECD (2021) and the World Bank (2022) are adamant that the answer to the persistent shortage of business skills in the local small business sector lies in embracing sector-centric AI-aided PLPs. Epstein et al. (2023) observe that PLPs drive greater personalisation, adaptation, and learner-centricity.

Meanwhile, new supporting evidence reveals that AI-aided text-generation tutors can catalyse real-time access to valuable business education and information (Atherton et al., 2024). Echoing this view, Kaluarachchi et al. (2021) think that the advent of adaptive learning ecosystems has made it easier for users to seamlessly access vital business education content anytime, anywhere, thus making learning a 24/7 experience. Simply put, the days of contact learning ecosystems are gradually losing relevance and significance (Epstein et al., 2023). In affirming this reality, Iqbal et al. (2024) noted that the world has quietly and firmly stepped into an era where the virtualization and personalization of learning are rapidly gaining traction across the globe.

The proliferation of AI-aided tutorials, plus the latest moves to blend chatbots, text generators and game mechanics into digital learning ecosystems, are changing the face of small business education (Ouyang & Jiao, 2021). This explains why Iqbal et al. (2024) regard PLPs as critical pivots in creating, capturing, and providing a learning experience hinged on each learner's distinct social context and learning style. One of the key differentiators of a PLP is its ability to put the learner at the front and centre of the learning activity, thereby making the learner feel valued and respected (Nadan et al., 2023). Thus, PLPs play a central role in amplifying the learner's voice, thereby effectively guaranteeing the greater personalization of the learning encounter. (Pashler et al., 2008).

Against this backdrop, this study relied on the DSR method to conceptualize and design a BA-PLP prototype that combined the interactive power of chatbots, the language processing and human conversation mimicking prowess of AI-based text generators, and the reflective abilities of game mechanics, to produce an interactive learning tool that is seamlessly accessible. The prototype's efficacy and user interface capabilities were evaluated by 71 small business owners using a UX tool. The UX tool questionnaire in this study used a Likert scale of 1-5 to further gauge small business owners' perceptions and attitudes toward the prototype. The tool questionnaire consisted of statements in Table 1 below.

Although the tool and the questionnaire were initially shared with 100 small business owners across South Africa in various sectors, only 71 (71%), who are mainly located in Gauteng province, responded to the evaluation exercise. The 29 (29%) who failed to participate cited, mainly, pressing business commitments. The following is an elaborated summary of the study's findings. Table 1 below is a condensed summary of the results of their scores from the Likert scale of 1-5:

Table 1. Post Personalised Learning Platform User Survey Results,
1=Strongly Disagree, 2=Disagree, 3=Not sure, 4=Agree, 5=Strongly Agree

No		Strongly Disagree	Disagree	Not sure	Agree	Strongly Agree	Total
1	Did you find the platform informative and educational		3	30	9	29	71
2	Was the platform easy to use			2	34	35	71
3	Did you find the content in the platform useful		7	25	11	28	71
4	Did you find the platform interactive and engaging		7	23	13	28	71
5	Are you satisfied with the features of the platform	1	5	25	11	29	71
6	Will you recommend the platform to others?		2	4	14	51	71
	TOTAL	1	24	109	92	200	426
		0.2%	5.6%	25.5%	21.5%	46.9%	

Table 1 above demonstrates that of the 426 responses collected from 71 users, 200 (46,9%) responses strongly agreed on the positive aspects of the platform (as set out in questions 1 to 6), 92 (21,5%) agreed, and 109 (25,5%) responses were undecided ('Not sure'). There are few responses under the category of Disagree (24) and Strongly Disagree (1), highlighting the mixed nature of the reactions obtained. However, another concerning category of responses is the undecided ('Not sure'), especially in questions 1, 3, 4 and 5. The detailed results of each category are outlined in the sections below.

Reliability test

Cronbach's alpha was used further to determine the reliability and trustworthiness. The reliability results can be interpreted as follows: 0.7 or above is considered acceptable; 0.8 or above indicates good reliability, and 0.9 or above demonstrates excellent internal consistency.

Table 2. UX Tool Reliability Test Results

Cronbach's Alpha	**Reliability Interval**	**Category**
0.821	7	Good reliability

The reliability test in Table 2 is based on 71 small business owners' responses to 7 statements posed to them in the questionnaire. The value of 0.821 falls within the category of good reliability based on Cronbach's Alpha, which confirms that the statements and answers from the UX tool questionnaire are reliable.

Educational and informational effects

An educational platform is deemed informative and educational if its learning materials are considered relevant, diverse, and valuable to each learner's educational needs (Pashler et al., 2008). In affirming the same view, Ariel et al. (2020) posit that such a platform not only renders a 24/7 access experience to learning materials but also allows users to absorb new knowledge anytime, anywhere – thereby guaranteeing important learning freedoms. Most importantly, Kaluarachchi et al. (2021) correctly argue that an informative, educational platform offers a matchless adaptability experience and diverse content.

Further, the educational value was measured by four proxies, i.e., (a) the platform's exceptional ability to facilitate easy access to business concepts that learners found valuable and applicable in their business settings (Pashler et al., 2008), (b) the ability of the platform to cover a wide array of business topics that users consider worth their expense and effort, (c) the ability of the prototype to win the confidence of first-timers, and (d) the ability of the platform to be functionally-correct, or its ability to serve its intended purpose optimally (Nadan et al., 2023).

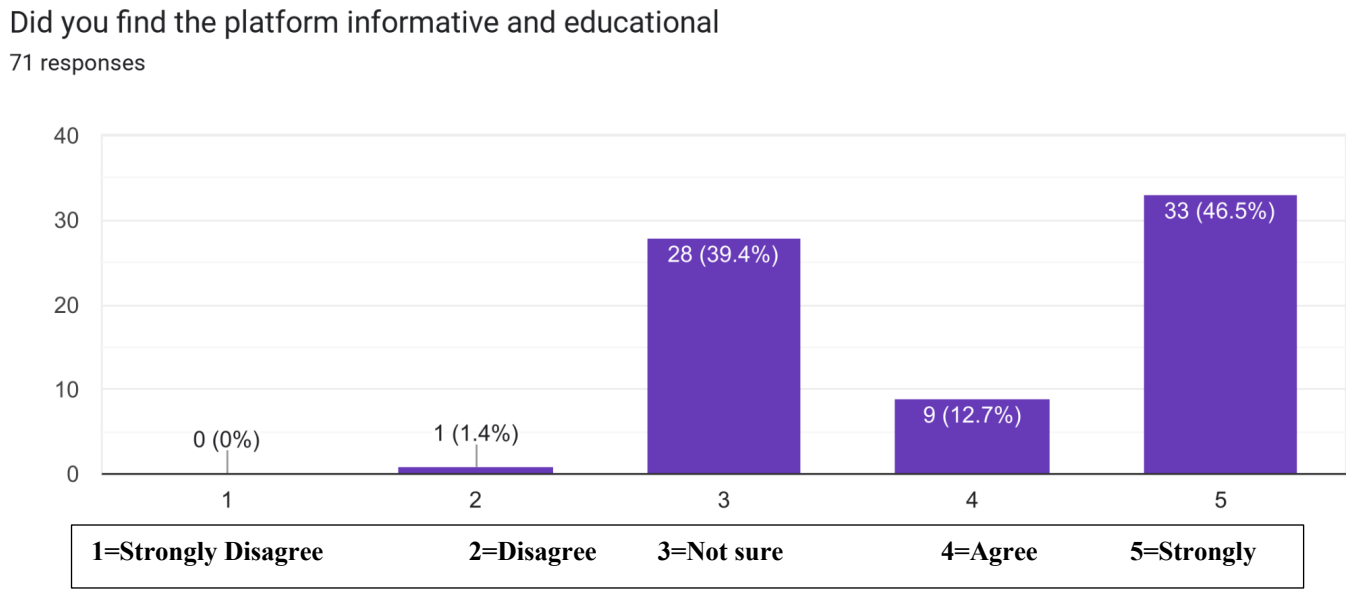

Figure 3. Informative and educational graph

Of the 71 first-timer prototype users, 33 (46,5%) strongly agreed that the prototype was a rich source of informative and educational material, whilst 9 (12,7%) ticked the Agree box. Interestingly, 28 (39,4%) expressed an indifferent opinion whilst 1 (1,4%) ticked the Disagree box, probably revealing that a clear majority felt the platform was a good source of educative business management information. It is equally encouraging that none of the 71 users ticked the Strongly Disagree box, perhaps highlighting their confidence in the prototype's educative capability.

However, whilst the positive educational effect of the platform was widely acknowledged by a significant number of users, the mammoth task lying ahead is to maximize the platform's educational value by, among other things, including a wide range of business topics and concepts and, most importantly, by reviewing and rethinking its educational materials and instructional tools to keep abreast with the users' ever-changing social circumstances and shifting business educational trends. In concurrence, Upadhyay and Khandelwal (2018) point out that due to the ease and low cost of user switching, facing most educational platforms, most designers are constantly under pressure to upgrade and reimagine their functionality features to bolster their educational appeal and value.

Content usefulness effect

Nadan et al. (2023) describe educational content as a body of systemically structured knowledge, information and resources necessary to achieve the objectives of a clearly defined educational programme. Rukadikar and Khandelwal (2023) underscored the propelling role of good educational content when they reiterated that educational content must be seen to be relevant and meaningful and be designed to satisfy a predetermined learning goal. In other words, mastering essential competencies and aptitudes to create, capture and deliver desired learning outcomes are required.

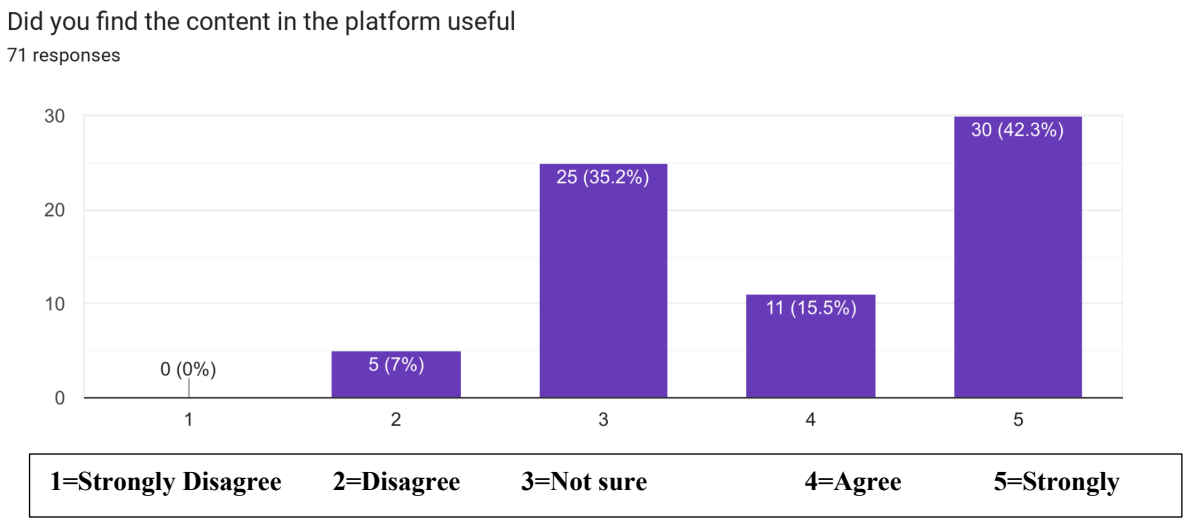

Figure 4. Content usefulness graph

Regarding the usefulness of the content presented, 30 (42.3%) ticked the Strongly Agree box, implying that the content was relevant and appropriate; 11 (15.5%) ticked the Agree box, whilst a sizeable number, 25 (35.2%) ticked the Neutral box, suggesting that they were indifferent. Meanwhile, 5 (7%) disagreed, whilst none ticked in the Strongly Disagree box, indicating that those who felt the content was irrelevant or inappropriate were in the minority. This perspective resonated with the views of Newton (2015), Rukadikar and Khandelwal (2023), and Murtaza et al. (2022), who concur that the difficult task facing many educational platforms is to offer comprehensive business education content that is fit for purpose, easy to access and use, and highly learner-centric.

In support of this view, Rukadikar and Khandelwal (2023) point out that in actual practice, four elements typically underwrite an impactful education content, i.e., (a) its ability to cover sufficient ground (Thai et al., 2021), (b) its usefulness and applicability in a real-world context (Newton, 2015), (c) its adaptability to new knowledge trends (Murtaza et al., 2022), and (d) the user-friendliness of its functional features (Kashive & Mohite, 2022). In conclusion, it is evident that most users gave the platform's educational content a vote of confidence.

Engagement and interactivity effect

Arievitch (2020) places emphasis on the central role of interactivity in creating a successful personalised learning platform. It delivers an immersive and captivating learning experience that seamlessly captures learners' emotions and interests. Against this backdrop, the questions on whether the functionality features of the platform were both interactive and engaging triggered mixed feelings. Out of the 71 users, a total of 28 (39%) and 13 (18%) confirmed the interactivity and engagement effect of the prototype by ticking the Strongly Agree and Agree boxes, respectively, whilst a significant number 23 (32%) did not express a view – perhaps implying the need to enhance the engagement features of platform. Meanwhile, 7 (9%) felt that the features were not interactive and engaging enough. However, no single user ticked the Strongly Disagree box, reaffirming the platform's positive engagement effect.

Satisfaction effect

Three features of the platform that formed an integral part of the evaluation included game mechanics, chatbots, and AI-aided text generation. Whilst the game features were instrumental in captivating the users, the chatbot was a vital cog in driving real-time feedback. AI-aided text generation was pivotal in framing underlying business concepts and terms. The evaluation of the users' satisfaction experiences effectively measured each user's perceptions of the platform's utility, ease of use and overall performance (Law et al., 2009). The idea was to allow users to inform, shape and deepen their lived impressions and user experiences. Laugwitz et al. (2008) posit that understanding user satisfaction patterns helps to detect and implement features that address sticking points, thereby helping to enhance the platform's appeal.

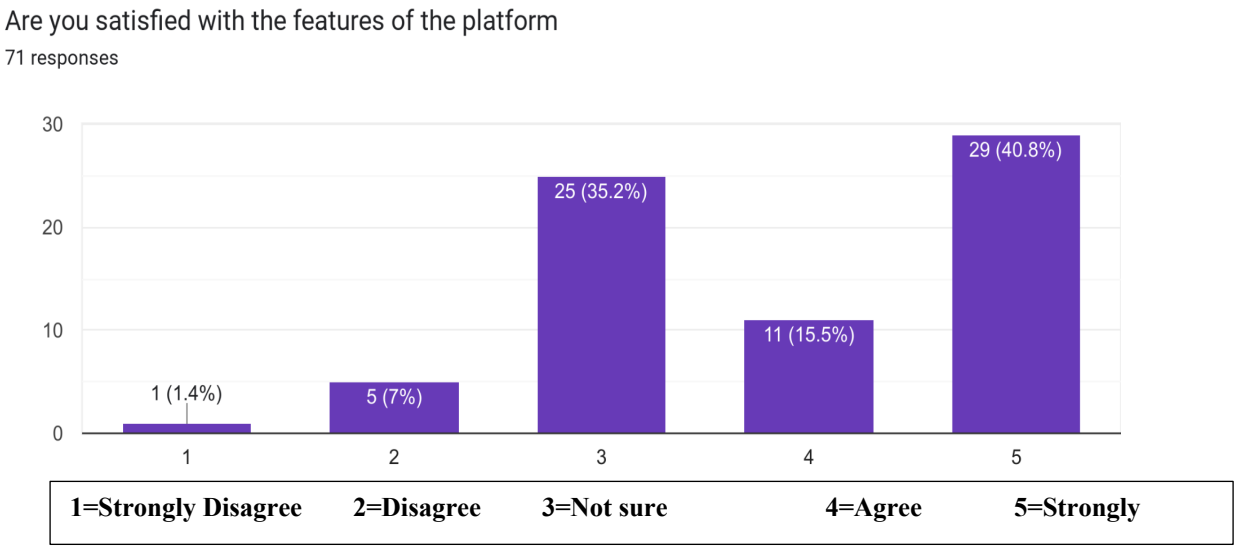

Figure 5. User satisfaction graph

Out of the 71 users who took part in the prototype evaluation exercise, 29 (40.8%) strongly felt that its features (chatbot, AI-generation and game mechanics) were impressive. Another 25 (35,2%) expressed an indifferent opinion, 11 (15,5%) merely agreed, 5 (7%) had a negative user experience, whilst only 1 (1.4%) ticked the Strongly Disagree box, possibly indicating their dislike or disapproval of the platform.

Knowledge effect

Gauging the knowledge effect (that is; the quality and relevance of information learned) of the prototype formed the basis on which the platform's content was refined and enhanced. The platform's knowledge effect was measured by three proxies, i.e., the usefulness of the knowledge acquired (Nadan et al., 2023), the depth of the knowledge (Nadan et al., 2023), and the applicability of the knowledge imparted (Laugwitz et al., 2008).

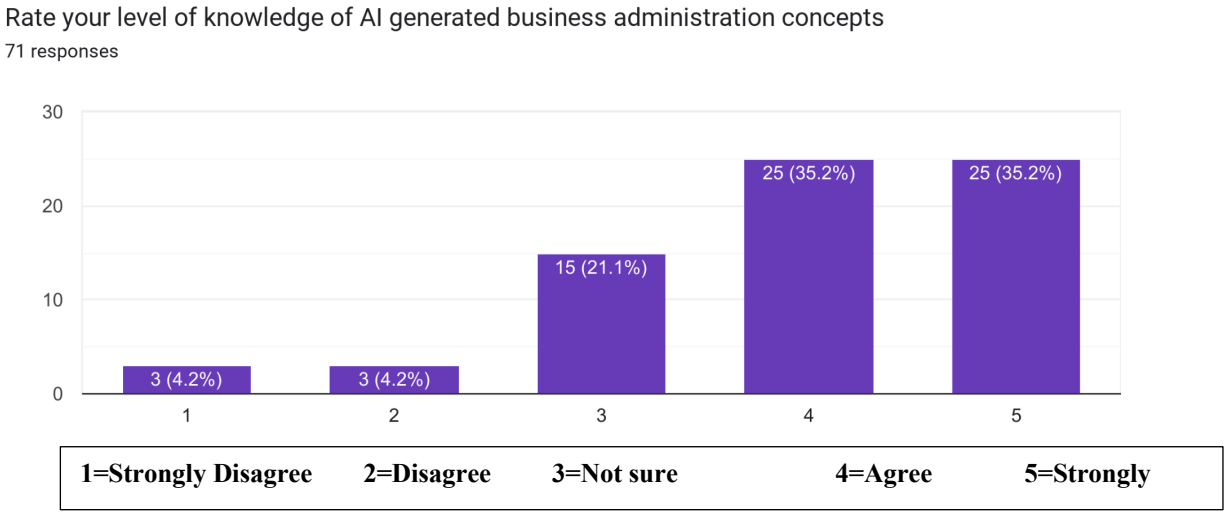

Figure 6. User AI knowledge level graph

When asked to determine whether their interface with AI-generated business concepts had a positive effect on their mastery of business management language, 25 (35,2%) ticked the Strongly Agree box, meaning that they acknowledged the prototype's positive influence; 25 (35,2%) ticked the Agree box, implying that they approved of its positive effect; 15 (21,2%) took a neutral position; whilst 3 (4,2%) ticked the Disagree box, indicating that they felt that its effect was not that significant. Moreover, only 3 (4.2%) ticked the Strongly Disagree box, indicating their outright disapproval of the features.

Ease of use effect

Platform usability is a functionality attribute used to determine the user-friendliness of the prototype interfaces. The word "usability" also refers to methods for improving ease of use during the design process (Laugwitz et al., 2008). It also entails the

ability of a user to log in and navigate around an app quickly and to easily locate, access, and apply vital features without any difficulty (Law et al., 2009).

Concerning whether the platform was user-friendly, the following responses were observed: an overwhelming majority, 35 (49.2%), ticked the Strongly Agree box, indicating their total approval; 34 (48%) ticked the Agree box, possibly expressing their confidence in the platform's user interfaces; 2 (2.8%) ticked the Neutral box, implying that the number of those who were indifferent was inconsequential, whilst none of the users neither disagreed nor strongly disagreed.

Recommendability effect

The success of the platform depends not only on its ability to attract a considerable number of endorsements but also on its ability to widen its reach, especially within the broader small business sector. Satisfied pioneer users are often regarded as one of the influential blocs which can be harnessed to promote and champion its widespread use and promotion. They achieve this by recommending the platform to their colleagues and compatriots in the local small business development movement.
Regarding whether they may recommend the platform to third parties if such an opportunity arises, 51 (71.8%) and 14 (19.8%) ticked the Strongly Agree and Agree boxes respectively, implying their willingness or keenness to rally fellow small business owners behind the platform; 4 (5.6%) ticked the Disagree box, indicating their reluctance to recruit fellow small business owners for the platform. None of the users ticked the Strongly Disagree box, whilst an insignificant number 2 (2.8%) did not specify their response, meaning they were indifferent.

Suggestions for further enhancements

An open-ended question that allowed the users to suggest areas of further improvement formed an integral part of the evaluation. This allowed each user to provide recommendations for the future use or improvements of personalised learning platforms. To this end, six brilliant suggestions subsequently came to light, namely:

a) The need to infuse a vernacular language translator to accommodate non-English users,
b) The use of emojis to affirm a correct answer, with the view to boosting the morale of learners,
c) The need to refine the content not only to simplify and broaden it but also to enrich its pedagogical value,
d) The need to make the topic of financial literacy an integral part of the content, especially given that most small businesses reportedly suffer from inept financial management practices,
e) The need to modify the log-in features to guarantee fast access and real-time processing of instructions, and
f) The need to make the game more thrilling and exciting by adding more quiz questions.

It is essential to note that the software engineers will only incorporate suggestions that are likely to add intrinsic value to the final product.

DISCUSSION

Judging by the varied feedback from different sets of first-time users, five important takeaways can be deduced from this study, namely:

(1) The advent of new technologies is widely credited with catalysing the evolution of personal learning, and these learning models are tailored to an individual learner's distinguishable uniqueness (Nadan et al., 2023). Newton (2015) contemplates that it is built on the notion that learners naturally manifest diverse learning needs, hence the need to drive a learner-oriented approach. However, its popularity and significance remarkably increased in the late '90s when AI-aided tutors emerged. That AI technologies catalysed its rapid proliferation is an indisputable fact (Chen & Wan, 2020).

(2) The prototype received a significant vote of confidence from most users, although this thumbs-up had some reservations attached. The PL as we know it today has undergone a total makeover, especially since the arrival of AI-powered learning. This virtualisation of learning had a ten-fold impact on self-directed learning journeys. PL is not only a typical example of self-directed learning but also a key imperative in driving learning adventures that are inextricably linked to each learner's distinct learning styles and tastes.

It departs from the traditional one-size-fits-all approach by being rooted in learner-centricity theories such as humanist, connectivism, constructionist and collaborative learning. All these theories played a marked role in influencing its theoretical evolution and methodological direction. For instance, the connectivism theory is credited for influencing and reinforcing its primary focus and ideology by underlining the need to build lasting connections and networking between the tutor and the learner. This confidence boost is vital in two ways: (i) it provides the basis to progress and enhance the functionality features of the PLP (Nadan et al., 2023), and (ii) it provides the necessary inspirational boost.

(3) Tailored learning experiences can be reimagined by infusing components such as game mechanics (to make learning a fascinating and captivating experience), AI-generated business concepts (to gain mastery of the business language), and chatbots (a 24/7 high-speed feedback tool to make the learning encounter more reflective and bi-directional).

(4) While the popularity of AI-aided personal learning represents a spectacular breakthrough in the history of self-directed learning, there is a growing need to promote a responsible approach to PLPs. There is a need to limit the risk posed by exposing young learners to too much online activity. AI-aided learning can be a curse to society if mechanisms are not implemented to limit the use of technology and to use it mainly to complete important tasks. Removing the physical tutor from the learning mix has its pitfalls, i.e., it creates an over-dependence on technology, and this can degenerate into a chronic mental health syndrome (Limone & Toto, 2021). As this study noted, the need to guard against such a habit or addiction cannot be over-emphasized.

(5) There is a need to take to heart some of the brilliant suggestions put forward by first-time users. Favourable consideration of such inputs will send two clear messages: (a) making users feel they are an integral part of the prototype-development effort, inculcates a deep sense of buy-in and collective ownership of the idea and its outcomes, and (b) it reaffirms the cogwheel role played by users in shaping and sculpting a novel solution to the skill challenge. This, in turn, improves the platform's user-centricity and value. However, whilst these plausible suggestions must be hailed, there is a need to take a cautious or incremental approach when fusing them into the final product. In other words, the need to take these suggestions through the rigour of scientific prognosis to improve their feasibility and bankability cannot be over-emphasized.

CONCLUSIONS AND FUTURE WORK

This study has set a benchmark on the centrality of personalised learning and how AI-aided text generators, thrilling game mechanics and highly interactive chatbots can be uniquely blended to revolutionize how PLPs can optimally dispense self-directed learning encounters. The study is one of the first studies in South Africa to address a PLP for small businesses. With the successful integration of the functionalities, the prototype has set a standard for PLP design.

This study also reaffirmed potential users' central role in helping frame and birth a home-grown PLP, symbolising a local-led breakthrough. The involvement of users in the framing process presented two significant advantages: (a) it increased the platform's user-centricity, and (b) it fostered a great sense of collective ownership and self-pride. On the other hand, while hailing input from first-time users, their suggestions and recommendations must also pass the rigorous test to improve the final product.

Building on these conclusions, the following four recommendations to optimise the functionality and usability of the prototype are put forward: (a) the need to take on board the suggestions from the users before launching the platform on a mass scale, (b) the need to ensure that a scientific process proves the rigour and efficacy of those suggestions, (c) the need to promote responsible platform use to safeguard the mental wellbeing of the users, and (d) the need to increase the visibility, recognition and reach of the platform.
Future studies should investigate the strength of the relationship between business personalised learning platforms and the performance of small firms.

Ethical Approval and Participant Consent: The necessary ethical approval for the study was obtained from Johannesburg Business School Research Ethics Committee, (Date: 08/05/2024, Ethical Clearance Code: JBSREC202438).

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APPENDIX A. Prototype And Survey Tool

Project Link for JBSGL24-065: https://landbot.online/v3/H-2213692-J5M53042ZYMG7BQT/index.html