WHAT ARE THE IDENTIFIED BARRIERS TO ACCEPTANCE AND ADOPTION OF DIGITAL HEALTH EDUCATION FOR HEALTH PROFESSIONALS?

AUT School Of Health Sciences

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ATTESTATION OF AUTHORSHIP

"I hereby declare that this submission is my own work and that to the best of my knowledge and belief, it contains no material previously published or written by another person (except where explicitly defined in the acknowledgements), nor material which to a substantial extent has been submitted for the award of any other degree or diploma of a university or other institution of higher learning".

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INTRODUCTION

The challenge to professional education is to provide clinical education that is evidenced based and holistic. The clinical aim is to increase participants' knowledge related to the intended learning objectives; however, there appears to be little research that focuses upon how the knowledge gained is transferred to clinical practice or how feedback is used to alter the education to improve the learner's experience(Kourkouta et al., 2021; Ng, 2023; Panigrahi et al., 2021).

Most nurse educators have worked within the nursing profession for some time and have their learned experience to rely upon when developing education for others (Bruno, 2022; Waryold et al., 2021). The educator who understands situations and lived experiences, can also possess the ability to develop the thinking of others through influence and chosen education styles.

Typically, the supported and structured undergraduate journey morphs to a self-guided, empowering, and self-directed learning environment that is commonly demonstrated in post-graduate study (Colthorpe et al., 2018; Russell et al., 2022). For nursing undergraduates, the learning style that they originally possessed needs to evolve to include an autonomy as they move to a post-graduate position.

Digital learning, online or blended learning is not a new phenomenon, the origins of such lay within historical correspondence courses or distance education by the open university in the 1960's or education broadcasting offered to remote communities in the Australian outback by television broadcasts (Sherbersky et al., 2021). This learning environment was traditional in its approach, having little focus upon socialisation, interaction with resources offered, or individual need (Satyam & Aithal, 2022).The advent of internet and the exponential growth of the World Wide Web for education within schools and universities has changed the attitudes once held towards distance education (Kentnor, 2015; Maurer, 2018; Sherbersky et al., 2021).

The 2020 pandemic created an urgent need for acceptance of digital learning. A new attitude of acceptance evolved, prompting a rapid evolution of online education (Bester et al., 2021; Doukas et al., 2022; Maphalala et al., 2021; Satyam & Aithal, 2022). The advent of online learning during this period led to an increased number of educators experiencing anxiety and reluctance to use a digital platform for engagement with the education (Maurer, 2018; Sherbersky et al., 2021). Such reluctance, according to educators is due to a perceived lack of engagement, reciprocity, and challenges with the quality of available

learning, leading to further issues with engagement and a decreased student experience (Al-Nimer & Alsheikh, 2022; Dahleez et al., 2021; Panigrahi et al., 2021). For the learners the lack of engagement is often attributed to misunderstood technology developments or poor education design (Gillaspy & Vasilica, 2021).

Technological developments and student engagement are intricately linked when considering the perceived value of learning in the digital arena. With the suggestion by some that the immaturity of digital learning and the inequality of the learning experienced creates challenges to achieving the desired learning outcomes (Dahleez et al., 2021). Such inequality can be attributed to a lack of regulation within the field, with educators not applying the same rigor within the digital arena that they apply to textbooks, research or other areas of teaching (Matthan & Finn, 2020).

It is agreed that the concept of quality education is not new or novel but when applied to the digital arena there is minimal regulation (De León et al., 2023). Opposingly, digital education is seen to attract the most scrutiny and monitoring due to the possible adverse effects poor quality clinical education can have upon clinical practice (Matthan & Finn, 2020; Perrin & Wang, 2021).

Instruments measuring quality within clinical learning include individual, governance, national policy, and standards to the learner or the institution itself. Indicators of quality include accreditations from national bodies such as the New Zealand Wound Care Society (Delva et al., 2019; Shraim, 2020). Accreditation is considered voluntary, as it is the authors choice to obtain it, but is considered essential for the success of digital education (Shraim, 2020).

A further measure of quality is the creation of a practice change (Ylönen et al., 2017). Evaluation of how and if nurses apply the knowledge gained from any education to their practice is presumed. A nurses' intent to change practice and expedite practice change following completion of clinical education, adheres to established principles of educational design (Perrin & Wang, 2021). By including the identification and subsequent filling of a professional practice knowledge gap, learning success can demonstrate the value of participation (Bryant & Posey, 2019; Dreamson, 2020).

In this dissertation, I aim to establish understanding of the findings that contribute to better understanding of the contextual issues and differences for those utilising online or digital education. This is challenging when considering the nuances that are possessed by the health workforce. It aims to understand the contextual differences for those utilising digital education as a learner and as an educator and the challenges that healthcare professionals face when using digital education.

The use of digital platforms, in an academic context, amongst post-graduate learners is becoming increasingly common, resulting in the need to adapt to a new learning environment beyond that of the traditional classroom. A literature search was conducted to correlate any findings of the research with present information utilising the Woundcare Integrated Learning Framework (W.I.L.F) as a demonstration of digital learning.

The W.I.L.F programme was designed and implemented after the author noted that the fundamental woundcare education needs were not addressed within undergraduate nursing placement. This resulted in an inconsistency of learning and an unsystematic approach to wound care. The programme was designed using a digital platform to ensure that nurses in any clinical setting were able to access the learning. This created an equity to those outside of the tertiary healthcare setting. The exponential growth of the programme from a local to national level, created questions of who actively sought the learning and more importantly who did not access the learning and their rationale.

This research attempts to identify, examine, and discuss online learning with application to the learning framework, through demonstration of engagement via quantitative data. Qualitative data is also used to demonstrate the users' thoughts of differing learning approaches, its affects upon their knowledge base, and clinical skill.

In summary, the aim of this study is to explore the barriers amongst health care professionals in New Zealand to the use of online or digital education, using a quantitative descriptive case study as its research design. However, due to the use of both quantitative and qualitative data the research design can be more accurately described as a mixed methodology. This will aide to inform educators about digital professional education design and assist them to embrace the changing education landscape.

LITERATURE SEARCH

Having noted the presence of digital learning for healthcare professionals, its growing popularity within professional education and within the authors own interest, it has been established that it is possible to design and address a research question.

A literature search was required to establish insights beyond that of the author's own personal beliefs while further reflecting the process of research (Tight, 2017). The search created themes and subthemes within the available reading. The search was conducted to gain knowledge and aid decision-making as to how to direct the study. Literature searching is a vital component of the scientific process of discovery giving kudos and grounding to the research goals and question.

The literature used within the search was limited to the following: Literature published in English between January 2020 and May 2022 on the online databases PubMed, Web of Sciences, Scopus, and Embase. The search strategy used was 'Nursing education' AND 'online learning' OR e-learning OR 'blended learning' OR 'digital learning' AND 'Clinical skills' AND 'peer review' OR "Feedback" AND "competency" AND "content" OR "Quality."

Inclusion and exclusion criteria:

The following inclusion criteria were used: All types of published articles in peer-reviewed journals, which are specific to the author's experiences of implementing online learning (fully online and blended) in clinical nurse education in response to the online education. These articles included evaluation studies, research studies, case reports, editorials, short communications, and letters. All articles had a focus on undergraduate and postgraduate nursing and woundcare education. Inclusion criteria for undergraduate education and postgraduate nurse education were aligned to the World Federation for Medical Education (https://wfme.org/standards/) definitions of basic nurse education and postgraduate nurse education to ensure a consistent terminology, due to variances across different countries. All articles with a specific focus on implementing responses were also included. Articles were all in English.

The following exclusion criteria were applied: Articles published prior to 2018 Medical / nurse education not using online learning (fully online or blended), including exclusion of online approaches specifically for assessment (such as verbal) or selection. Pre-clinical undergraduate nurse education, which provides foundational 'core' knowledge and skills, such as anatomy and physiology were also excluded. Publications that do not address the

development and implementation of online learning (fully online and blended) were excluded.

The search engines used were Google Scholar, CINHAL and Scopus via the AUT library website, in February 2023.

Literature themes were identified utilising a research paradigm method by Crookes (Crookes, 2004) The following chapter discusses the themes that were identified and how they relate to both the aim of the research and the research question.

LITERARY SEARCH THEMES

Several themes and subthemes were noted from the literature search. The majority of which were noted to be on the digital pedagogy and the reluctance of educators to use eLearning platforms for delivery or engagement. Many authors cited digital learning to be the virtual delivery of preconceived classroom education and had little understanding of the differences required to ensure leaning in a digital environment. Some authors considered an alternate blended learning approach, which incorporated a degree of classroom learning as the antidote to poor digital engagement. Providers of education available via digital platforms perceived the benefits to include ease of use, flexibility, usefulness to practise and authenticity. However, minimal focus was given to the content of learning or the effects upon clinical practice (Boni & Foley, 2020; Langegård et al., 2021). Counterfactually, the use of digital platforms was seen as reactionary with several authors citing the need for digital learning only being generated by the recent pandemic and/or the financial issues associated with face-to-face learning. Consideration also focused upon equity of access.

Digital equity was viewed to consist of digital literacy, access, and information technology to enable participation in a digital lifestyle. Digital equity enables the ability to capitalise on such technology to gain benefits to self and the community (Ozalp et al., 2022; Turin et al., 2022). The Covid pandemic has given recognition to the digital divide for communities that are already seen to be at a disadvantage such as Māori or Pacifica groups (Turin et al., 2022). Digital equity is defined as a "…condition in which all individuals and communities have the information technology capacity needed for full participation in our society, democracy, and economy. Digital equity is necessary for civic and cultural participation, employment, lifelong learning, and access to essential services" (https://www.digitalequity.nz/, 2023).

Many authors referred to challenges, obstacles, or barriers to learning. Barriers to learning refers to the individual's behaviour and personal evaluation of perceived hindrances that are encountered when using online or blended learning (Hamse et al., 2021). When designing

education, it is essential for the educator to note the incumbents' real or perceived fears, pains, or barriers. Due to the prolific availability of digital education, it can be considered vital that the educator and learner recognise the competition that is seen in health education. Recognition must also be given to the possibility of bias alternative sources can present such as the wound product manufacturers educators, due to the focus upon their own products that are used as teaching tools (Karadag et al., 2021; Riedel et al., 2022).This perceived competition has contributed to further barriers relating to misleading advertisement, exploitation of vulnerable learners, lack of trust, and lack of authentic learning. In a competitive environment, the focus may shift towards quantity rather than quality of learning, diluting the credibility of the learning (Hutchings et al., 2022; Wetzlmair et al., 2021).

One of the popular barriers to learning was identified as digital inequality. Digital inequality relates to the digital literacy, system usability and cultural approaches that accept, encourage, or deny digitalisation (Bester et al., 2021; Vainauskiene & Vaitkiene, 2021; Wong et al., 2021). It was also noted that there was presumption within the literature that all learners had digital literacy. Digital literacy refers to the ability to use digital technologies and navigate online platforms effectively. When individuals have limited digital literacy skills, they may find it challenging to access and participate in eLearning programs.

There is a preconceived notion that eLearning is inherently difficult for individuals with low digital literacy. This perception often stems from the assumption that eLearning requires advanced technical skills or prior experience with digital tools. As a result, some may consider eLearning inappropriate or unsuitable for individuals with limited digital literacy. (Bester et al., 2021; Martinengo et al., 2019; Xiaomeng et al., 2019). A subset of this theme were the limitations created by the delivery or style of the learning, recognising digital apathy.

Digital apathy refers to a lack of interest, motivation, or engagement with digital technologies or online learning platforms. It is a phenomenon where individuals may feel disconnected, or overwhelmed by the digital realm, leading to a limited willingness to participate in online learning or take full advantage of its benefits. This apathy can arise due to assorted reasons, including technological barriers, information overload, lack of digital skills, or a preference for traditional learning methods.

Within the search, the delivery of digital education was noted to be beyond that of virtual delivery. True digital education is based upon digital pedagogy (Langegård et al., 2021).

Digital pedagogy utilises a learner centred approach creating a multi-level communication between learners, peers, and educators (Gillaspy & Vasilica, 2021). Educators often ignore this differing approach due to a lack of understanding of the difference between virtual and digital education engagement. Virtual education engagement is reliant upon the traditional teaching approach of one-way communication (Bryant & Posey, 2019) By continuing to use simple virtual delivery a further barrier is created by the educators who fear that digital education will reduce, or remove their favoured classroom based lecture approach (Bester et al., 2021; Boudry et al., 2019; Langegård et al., 2021; Nkomo et al., 2021; Oducado & Soriano, 2021; Urstad et al., 2021).It is important to note as it is often confused with a didactic approach to lectures that have simply moved into an audio-visual or simply audio modality.

Counterfactually, digital engagement is based upon content, pedagogical and technological knowledge combined to create a pedagogy of learning (Keane & Topol, 2021; Litwin et al., 2022; Melling, 2020).

Authenticity of the education was also an identified theme (Asanova et al., 2022; Connolly et al., 2020; Martinengo et al., 2019; Ryder et al., 2018). Authenticity is presumed in published articles with many citing the journal, in which an article appears as reassurance for the user that the information given is evidence based and true. Such dialogic pedagogy indicates that the use of authentic questions and statements results in evaluation that further indicates dialogic discourse and represents authenticity within the learning (Schaffalitzky, 2022). Within eLearning this presumption is unavailable, and it is the reader that must investigate the possibility of poor research or value in the online platform.

eLearning, or online learning utilises a digitally accessed platform to engage the users with knowledge and skills (Du et al., 2013). By using a specific learning platform such as Ko Awatea (a limited access health education digital website) assurance is given. It is assumed that the users will have sought or been advised to access, due to education needs, by a Ko Awatea module author or clinical educator, who recognises the need for education and utilises it to ensure learning goals are met or as part of a blended learning package (Hutchings et al., 2022). There are numerous available platforms that give equal assurance outside of the university structure. However, such platforms may have an undisclosed link to woundcare manufacturers, inconsistent peer review or a lack of clinical or cultural practice knowledge.

It is recognised that anyone can create education within a digital space, such as Youtube video but not every educator can create evidence based trusted digital education. The Ko

Awatea platform is an eLearning platform that is utilised by a majority of Te Whatu Ora to address eLearning needs. All registered and non-registered staff working in the tertiary setting are automatically given access to the site and are expected to utilise it for mandatory education needs. Those that are working in the primary setting are welcome to utilise the site but must request access. The use of the site for learners is free, however there is a fee for the site module authors that is covered by Te Whatu Ora. The platform has seen an increase in use for clinical education since the Covid pandemic but prior to this, it was utilised for the transference of supportive information of face-to-face learning or mandatory learning. It is also seen as impartial due to its lack of sponsorship from industry (https://koawatealearn.co.nz/, 2023).

The dominating theme that was demonstrated throughout the literature was the desire to provide learning that was considered effective for change. Such efficacy was demonstrated with the need to utilise evidence-based learning. Learning was provided to encourage or facilitate practice change. There appeared to be little focus on how the learning had changed clinical practice, but it was presumed that practice change was likely. According to the literature in educational settings, the amount of time spent reading, learning, and acquiring knowledge is empirically linked to ultimate performance and education attainment (Alosta & Khalaf, 2021; Harerimana & Mtshali, 2021; Noyes et al., 2020). Counterfactually, it is seen as fundamental knowledge of modern society that people will own and utilise skills that include the confident and competent use of digital technology for education design and implementation (Honkavuo, 2020).

A subset of this theme was the identification of the learner's own motivation to learn. Such motivation was identified by many through the individual engagement (Harerimana & Mtshali, 2021; Smith, 2022; Watson et al., 2017; Wong et al., 2021). Counterfactually, such engagement did not recognise the possibility of autocratic engagement to mandatory learning or eLearning as part of a blended learning programme. This could be viewed as coercion to engage with digital learning but due to the lack of information on this subject there is no apparat definitive position (Bester et al., 2021; Martinengo et al., 2019).

The literature search has enabled the identification of themes and subthemes. It also identified that although digital learning has been readily available, there have been issues or barriers that have stopped its mainstream adoption. The search has enabled a clear focus of the research aim.

Research Aim

To examine the efficacy of the web-based education for nurses in terms of knowledge learning and skill performance. To further capture the key role of web-based distance education at a wider perspective, utilising the W.I.L.F (web based and blended learning package) as an example.

Research Question

What are the identified barriers to acceptance and adoption of digital health education for health professionals?

However, when having considered the literature search and the available data the research question addressed is:

What are the barriers to the acceptance and effectiveness of the ko Awatea learning platform and the wound integrated learning framework learning modules for wound care education?

The literature search and background information has highlighted that despite the phenomenon of digitalisation of education, most learning focuses upon undergraduate or formal education. In the next chapter the study design will be identified with focus upon how the author's own worldview and how this affects the research methodology.

STUDY DESIGN

The primary intent of this study was to examine the impact of online education and to identify the perceived barriers to engagement of professional online education resources. Based upon the levels of engagement of health professionals with the Woundcare Integrated Learning Framework (W.I.L.F) learning modules. The following chapter reviews the chosen study design, and how the author's own worldview affects this.

The learning environment is directly affected by the educator, with their choices of approach, culture, experiences, and personal background (Creswell, 2023; Proudfoot, 2022). This also affects the interpretation or analysis of data themes or results. Nursing has long been associated with traditional practices that can be seen as limiting in collecting data and leading research (Smythe et al., 2022). The nursing philosophy and that of the researcher directly affects the chosen research approach (Coleman, 2019; Creswell, 2023). As a researcher and nurse, the author holds a pragmatic worldview.

The pragmatic worldview reflects the need for action within a situation and subsequent consequences. Measurement of data when considering this view is not focused upon a specific methodology of research, using all forms to ensure that the problem is appropriately addressed (Creswell, 2023; Smythe et al., 2022; Wainwright, 1997). Both qualitative and quantitative data were available in the study, due to the dominance of the quantitative data available a descriptive quantitative case study was utilised as the research design. This is also in line with the authors and nursing worldview (Patton, 2020).

The use of a pragmatic worldview also effects the authors position as the designer of the W.I.L.F modules as it has the potential to inform and create more effective design of digital learning modules to improve the skills of a workforce in attending to clients requiring wound care.

Data was collected from the Ko Awatea Learn site W.I.L.F modules. The modular design of the learning is based upon a basic, enhanced, and advanced approach to woundcare education. The continued use of the modules providing an understanding of levels of engagement with online learning in a subject matter health professionals engage with regularly.

All those that have enrolled with the Ko Awatea Learn W.I.L.F modules were eligible. Students who were enrolled in the basic modules are automatically enrolled for the other

available modules upon completion. Presently, the learning has a linear approach for the basic and enhanced learning but with flexibility to the advanced learning modules to create targeted education.

The author instigated the W.I.L.F program and is also instrumental in the design and implementation of the learning presented upon the site. Due to the volume of education required, educators were also recruited to ensure that the learning was valued, and evidence based. All the education offered, had a structured approach to engagement with assessment points. Some of the learning is also utilised as pre-learning for face-to-face engagement.

RESEARCH DESIGN

The purpose of the study was to examine the characteristics of the barriers to learning that were perceived by the health professionals using online/ digital learning platforms. The study utilised data provided by the W.I.L.F within the Ko Awatea Learn platform.

The data originated in November 2022. The method of collection was via feedback survey and is a dynamic, ongoing, and evolving form collected over a 6-month period. The platform is utilised by Te Whata Ora for digital education. The platform enables educators to launch, monitor and ensure that the education given is evidence based through yearly review. It also provides the ability to receive feedback in both a quantitative and qualitative manner that can be examined through case study of real-world issues (Clarke et al., 2015; Mason, 2021).

Case study is viewed as bridge between the theory and practice that can be useful in translational research. It can identify the connection between practice and research (Clarke et al., 2015). It is used by registered nurses and other health professionals as an educational tool, and a method of data collection but more importantly to describe, explore and evaluate a phenomenon within the context that it occurs. In this case, the barriers to engagement within digital woundcare education (Thomas, 2017).

By reflecting both the qualitative and quantitative data, the trends, and details of the situation are viewed and related to the author's learning and literature search. An example can be the lack of understanding of the digital learning access process, or the time taken to understand the changing learning environment.

REFLEXIVITY AND RIGOUR

In the last chapter, the research design and methodology were discussed with focus upon the quantitative descriptive case study and how the research subject of Ko Awatea Learn was used to provide data. In the following chapter the reflexivity, rigour and validity are examined to ensure that the author's own bias and position are clearly defined. This is crucial in the research process as it is a widely accepted view that a researcher's personal experiences can impact a research focus (Thomas, 2020). The chapter continues to review the study design with focus upon the use of the available quantitative and qualitative data.

According to Braun and Clarke (2022) reflexivity is an integral part of the thematic analysis within the research process. This involves being aware of own position, expectations, and theoretical assumptions, and how they influence the areas that are noted, or easily identified (Braun & Clarke, 2022; Fereday & Muir-Cochrane, 2006). It is important to note that my own privileged position of working within a situation encourages the use of digital education, providing tools that enable access and facilitation to others. The ability to reflect upon this and my social positioning recognise how my personal assumptions may influence my research and is considered a crucial step in the recognition of reflexivity.

Qualitative research is the often-taken route by nurse researchers. With the nursing field associating qualitative research as being empathetic and central to thoughts and feelings of those being studied. Qualitative methods involve reflexivity and awareness of own bias and are considered a natural fit for the subjectivity central to constructivism. Education research is seen as acquisitive in nature and is popular amongst the post positivism paradigm (Grove, 2013). When considering the methodology, it is noted Wainwright (1997) stated: "ontology is what exists, epistemology is how we can come to know about it and methodology is the means of acquiring this knowledge" (Wainwright, 1997).

A descriptive case study of one location was viewed as the most appropriate form of the research to take. The methodology aids in the exploration of a phenomenon using data sources, it undertakes the exploration through a variety of lenses to reveal the multiple facets of the phenomenon. Due to the data being both qualitative and quantitative it was important to note that the data was predominantly quantitative.

Quantitative research is reliant upon numerical data, following a post positivism paradigm, to develop knowledge, with consideration given to cause and effect, use of measurement, observations, and test of theory through isolation of the variables, relating them to determine relationships. Counterfactually, qualitative methods follow from a constructivist paradigm. Constructivism was a philosophical and methodological response to the pairing of post-positivism with quantification (Creswell, 2023; Maltby et al., 2013).

The exploratory descriptive case study design was used to explore the perspectives of individuals using the W.I.L.F and healthcare professionals who have engaged with the learning. It utilises their qualitative feedback from the modules and the anonymous quantitative data that was generated by their engagement with the learning (Pack 2018).

The purpose was to gain perceptions from those most impacted as recipients of the learning, with focus upon who had been guided to engage with the learning through leadership or those who had engaged through their own identification. This approach gives value to the quantitative data but notes that the data set from the qualitative learning also gives some explanation of contradictions within the data, allowing for further examination (Creswell, 2023; Grove, 2013; Tone Elin et al., 2018).

The methodology was used to capture the multiple dimensions of the participant experiences by using both the quantitative and qualitative results and is supported by Grove et al; (2013) in the ideal that use of both data types gives more understanding of influential factors. Several factors influenced the choice of an empirical approach to the research. Primarily, there were contextual or local problems associated with the limited secondary data available for the phenomenon explored due to the age of the W.I.L.F modules. However, following an extended period of data collection, the numbers available were considered appropriate. The research was approached in a phenomenological paradigm with the understanding that the reality of any situation is a socially constructed ideal created by human actors (Kalkstein et al., 2022). This approach aims to understand the lived experience as described by those who experience it for example the learner and their experience of online learning (Adams & Whittingham, 2016; Bester et al., 2021; Grove, 2013; Kalkstein et al., 2022).

In aligning to the pragmatic worldview, I wanted to uncover and make sense of the perceived reality of the users through the process of the quantitative data and the humanistic qualitative data given in the feedback upon the platform. I am also aware that the digital health landscape is gaining traction within healthcare society, recognising that this also influences my viewpoint. I endeavoured through regular meetings with my supervisors to avoid presumption.

VALIDITY

All procedures were performed in compliance with relevant laws, institutional guidelines, and approval with the knowledge that reflexivity creates transparency. It was recognised that dialogue is needed to form and sustain ethical research relationships, especially when prior relationships with participants already exist (McCabe et al., 2021). The relationship of educator and author creates a sphere of influence that can affect feedback. However, due to the anonymous nature of the feedback, this effect will be minimal.

The researcher's prior biases acknowledged preferences to educate using evidence-based care and a back-to-basics approach with a digital access focus. However, the process of reflexivity stimulated the need to be more open to explore the experiences and perceptions of the those requiring woundcare education, who were the subjects of its associated effect. The researcher also became more conscious of their position (as an educator who has a large sphere of influence) in the setting and sought to encourage and support the respondents to be open and honest about their experiences and feelings on the subject matter to provide data that would inform more appropriate decision-making.

Web-based data collection can simplify collection methods, furthermore web-based surveys can be set up by researchers using existing web servers to support questionnaire design and data storage and analysis. The use of web-based research makes the process of data collection and analysis faster. By utilising data from the Ko Awatea site, participants are responding as part of the learning and their responses are saved in a structured format.

Research using digital health approaches with a user-centred design, actively supports the population of interest and encourages uptake and effectiveness. The use of the data and how it was examined was discussed in this chapter with focus upon how it will be used in both its qualitative and quantitative forms. It highlighted that the quantitative data was dominant and therefore the use of a quantitative descriptive case study was rationalised. The next chapter discusses the ethical considerations of the study.

ETHICS

In the previous chapter the research validity, reflexivity and rigour were discussed, with focus upon web-based research and how the author's own worldview affects the research process. In this chapter, the ethical considerations are outlined, with focus upon safety in research practice.

The use of the Ko Awatea Learn site for the data gathering follows the guidelines of Ko Awatea Learn. The site collects both quantitative and qualitative data including age of user, number of times accessed, device information and role within healthcare. The qualitative data is limited to the feedback questionnaires that are written by course authors and accessible only to them and the administration.

The site seeks permission within the administration user agreement of the use information and the rationale for the data gathering, i.e., to provide, maintain, protect, and improve the information given and delivered via the site. The approval from the learner is presumed when the user agrees to the terms and conditions that are displayed upon login to the platform and refers to the unique system and that New Zealand Law governs. The participants are further assured that they would not be identifiable in any dissemination medium. This is secondary data collection with permission given by Ko Awatea Learn. The data is anonymised and is readily available to users and authors. This research is to better inform the work of the DHB. The site indicates that research may occur and that participant responses were used for research purposes are based on aggregated data and or fully anonymised protecting participant privacy.

The security of the site is assured through the site details, which states that the holding of personal information is performed following the Privacy Act 2020. The act notes how the use of personal information has changed with the advent of the technology, ecommerce, and social media, noting the challenges to the protection of personal information as the value of privacy increases, recognising privacy obligations and standards in relation to information privacy, (Dong, 2020). Further, the act ensures that without reasonable grounds, the information gained will be protected and only disclosed if the person or persons are deemed at risk (Dong, 2020).

In this chapter, the need for ethical approval was discussed, using the Ko Awatea Learn platform W.I.L.F modules of which the author is the instigator. The access to the publicly available secondary data was also discussed. In the following chapter the rational for using the sample will be examined whilst acknowledging the advantages and disadvantages of

using a convenient nonprobability sample and the rationale for the use of the W.I.L.F education will be discussed.

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SAMPLING

The sample used to gain the data can affect the validity of any study. In this chapter, the rationale for the sample will be discussed with focus upon how it was chosen and used.

Non-probability sampling is an umbrella term of all the sampling strategies not covered by probability sampling. Probability sampling infers that every member of the population has voluntarily chosen to be part of a study, opposingly non-probability sampling is sampling of those that have chosen to participate in an act that can be researched (Singh et al., 2022).

The convenience of the sample and acknowledging that those who have actively taken part in online learning creates a sampling bias. The population inference and conclusions are limited to a similar group but the overall purpose of the method is to gain an understanding of a pilot group, in this case volunteers to the online learning group, rather than the testing of a theory to a large group or community (Bryman, 2015; Singh et al., 2022).

The use of data that is considered a convenient sampling non-probability method with readily available data is common amongst new researchers who have created or been involved with developing projects such as the W.I.L.F (Bryman, 2015).

W.I.L.F was conceived in 2021 with the focus of ensuring that all health professionals had access to woundcare education. A building block approach ensured a foundation level of learning that could lead to enhanced and advanced modules. The consultation process included using woundcare industry experts from all health care settings to ensure evidence-based learning was offered. The programme was designed for digital learning access only, it was suggested that it could also support future face-to-face learning in the enhanced and advanced modules. The W.I.L.F modules of learning can be found here: https://koawatealearn.co.nz/course/view.php?id=7024 .

The sampling units were selected for ease of use due to the availability of data from W.I.L.F, the author's own position of digital editor of online content and the convenience samples of a pre-existing group i.e., those that have accessed the online resources. Advantage of web-based research is the potential for the acceptability to be higher compared to other methods. Furthermore, self-reported questionnaires are easily accessed by researchers, and increase the engagement of the researched (Changing Technology and Survey Research, 2019; Singh et al., 2022).

The sample is exclusively a population of health professionals, who utilise the Ko Awatea learning platform for online education with woundcare within their practice area. To assess

the impacts of online education upon the level of knowledge, data of engagement levels and the limited learner information available was examined. The retrieval of the results was entirely anonymous without any ability of linking the identities to the individuals.

A fundamental issue associated with non-probability convenience sampling, is coverage bias. Coverage bias occurs because not every user's culture, ability or eligibility is represented in digital learning (Lehdonvirta et al., 2021). It is recognised that differing groups access and use different websites or services. The researcher is only able to describe a population of active users accessing a specific service or website within a specific period, resulting in a bias that is caused by the inability to repeat the study in an identical format when considering the demographics of the users (Lehdonvirta et al., 2021). The sample covered the period of launch of the Woundcare Integrated Learning Framework (W.I.L.F) Foundation modules from November 2022 until April 15th, 2023, a period of six months.

The focus of the statistical data available demonstrated correlation of completion time and continuation through the modules on the website. Information also demonstrated the users' role, workplace, and geographical location.

This sample is 54% of users of the W.I.L. F programme. The sample is a non-probability sample. It is a representative sample of those that frequently engage with woundcare considering that they have actively sought and taken part in the learning.

Engagement with the learning reflected in the time used to complete online resources and individual modules. The completion of the remaining enhanced and advanced modules is suggestive of engagement with learning, or counterfactually demonstrating the possible issues with the learning creating need for repeated engagement. This will also give information to the barriers that are preventing engagement.

QUANTITATIVE SAMPLING

The examination of a representation of the health professional workforce that have engaged with online learning demonstrates a mathematical or statistical measurable dataset. For this research, this is the number of “hits” and the number of users of the W.I.L.F modules. The roles of those engaged and the number of modules were recorded. The core purpose of quantitative data examination is to interpret the results and provide ability to conduct behavioural analysis, information theory models and statistical correlation analysis (Biswas et al., 2021).

The Sample

398 users of the W.I.L.F were utilised as a convenient non-probability sampling method. The number was determined by the study dates: November 2022 to April 15th, 2023. The focus is upon those who have engaged with the foundation modules of the learning available at a national level. The W.I.L.F was selected as the area of study for being one of the new online resources available as a suite of learning in a non-tertiary education setting.

All those sampled were health professionals but were both registered and non-registered providers of woundcare in their practice area. Such practice areas varied from primary health (PHC), long-term care and tertiary setting. The results showed that most learners were from the tertiary setting with a registered health professional background. The continued learning that is required by health professionals’ results in a higher level of engagement with non-formal learning. Most users identified as female, which is also reflective of the nursing profession within New Zealand. Due to the anonymity of the data available it was not possible to decipher the precise location of learners beyond that of their Ko Awatea Learn agreement location point e.g., Bay of Plenty.

The use of a non-probability sample of a nationally available programme within a learning platform creates a sample that is purposefully selected, in this situation due to their own engagement with the woundcare education. Indicating, that their responses will be those of other modules within the platform. The advantage of a nonprobability sample is the ability to track change in attitudes or behaviours of the same learners over time. Opposingly, independent samples can yield minimal evidence about change. It is difficult, however, to predict the amount of change that is occurring without being able to review previous engagement behaviours (Changing Technology and Survey Research, 2019).

Further bias is created by the users giving inconsistent reasons or reflecting a disinterest in the qualitative data responses. With the suggestion that those who engage with feedback

surveys are already showing a bias due to their agreed engagement, again affecting the results of the survey (Lehdonvirta et al., 2021; Singh et al., 2022).

Method biases can be problematic due to the issues that they can create with measurement errors. Measurement errors threaten the validity of the data and further threaten the validity of the conclusions about the relationships generated by the data. The term method refers to the form of measurement at different levels of abstraction, such as the content of specific items, scale type, response format, and the general context (Podsakoff et al., 2003) At a more abstract level, method effects might be interpreted in terms of response biases such as social desirability, acquiescence, or leniency effects (Bryman, 2015; Glaser, 2013).

In this chapter, the research sample was discussed with focus upon how the research sample meets the needs of both the research aim and question. The following chapter outlines how the data was processed and analysed with focus of answering the research question. The use of the questionnaire and how the data was interpreted will also be discussed.

DATA PROCESSING AND ANALYSIS

The use of a quantitative descriptive case study remains dependent upon the analysis of any data that is gathered. This chapter considers the data and how it was obtained. Furthermore, the questions asked within the data are also examined with focus upon how this affects the available data and subsequent examination.

The qualitative and quantitative data were organised, analysed, and presented with focus upon the research aims and question. The qualitative data collected through the open-ended question was subjected to a thematic analysis. Data recorded from the closed questions were organised based upon the study's theme of barriers to adoption of digital learning. Data relating to the same themes were clustered to facilitate further analysis.

The quantitative data generated through the closed questions were analysed with the aid of statistical products for service solutions (SPSS-Version 20). This was used to derive frequencies and percentages, which have been presented in the charts in Appendix 2. Findings have been presented in narrative through descriptive analysis.

SELF-COMPLETION QUESTIONNAIRES

Self-completion of self-administered questionnaires are where respondents answer the questions themselves via the portal presented at completion of modules. Gaining professional development credits is dependent upon the user completing the components of the module and the questionnaire. Advantages of self-completion questionnaires include speed and low cost of administration, absence of interviewer effects, no interviewer variability and convenience for the responder. The prerequisite of the questionnaire also ensures that all those engaged with the learning will reflect in some form upon the learning itself. It is noted that through reflection, learners can gain a deeper understanding of the course content (Lin, 2021). Disadvantages include lack of ability to prompt or probe, difficulty asking other questions or collecting additional data. Further, the questionnaire may not be appropriate for some respondents (Bryman, 2015). Additionally, some respondents may not give usable content, similarly non-responses can be submitted and are seen as a refusal to participate in the qualitative research aspect (French et al., 2019).

QUESTION TYPES

The survey questions used were based upon the Likert scale. Likert scales or responses scales may generate dichotomous data (e.g., engaging 1 (low) to 5 (high), nominal data (e.g., Registered Nurse, Doctor or Health care assistant, resident alien), or ordinal data (e.g., not at all, a little bit, somewhat, quite a bit, a lot; or never, seldom, sometimes, often, always) (Hutchinson & Chyung, 2023).The advantages of scales include the popularity and therefore ease of use. Researchers use the scale due to the simplicity that the systems provide. Opposingly, this gives less value to the data the scales can provide (Aybek & Toraman, 2022; Celen & Aybek, 2022; Hutchinson & Chyung, 2023).

It is acknowledged that the tone of a survey can create a response set bias through the inference of negative or positive phrasing (Chyung et al., 2018). The questions used within the feedback survey for the qualitative data were focused upon dichotomous data gathering and were asked in a negative and positive viewpoint i.e. Did you find the learning engaging?

Response set biases are viewed as a potential threat to both the validity and reliability of a survey by creating inaccurate or inconsistent data. Researchers advocate against the use of mixed viewpoints surveys (Chyung et al., 2018; Hutchinson & Chyung, 2023). Counterfactually, grouping negatively worded questions together can indicate to responders the nature of the statements and thus absolving potential bias (Roszkowski & Soven, 2010).

A further question also gave an open-ended feedback option where the learner could give further commentary or feedback about the learning content, the delivery or engagement style or need for further information. It is acknowledged that closed-ended questions produce quantitative data, open-ended items, such as ‘List the top three things you like most about this module’ elicit qualitative feedback that can indicate a need for change. It is noted that the respondent rate for open ended questions is much lower than that of closed ended questions and this is reflected in the data with many providing minimal engagement (Zhou et al., 2017). The identified apathy to open ended questions is attributed to cognitive engagement, intimidation, and the visual appearance (Zhou et al., 2017). Counterfactually, the response rate to open ended questions can also be related to the learning content and reflects the individual's engagement with the learning itself (Behr, Bandilla, et al., 2014; Behr et al., 2013; Behr, Braun, et al., 2014; Behr et al., 2012).

DATA ANALYSIS

The use of the Ko Awatea Learn data was allowed through the author's position as an editing trainer. This position allowed for the creation of specific feedback qualitative data questions and access to the quantitative data that is recorded upon request of the module creators as required. The Ko Awatea Learn platform is continuously available and therefore the data could change with exponential growth or access. In a traditional machine learning scenario, a data set is assumed to be generated according to unknown, but stationary, probability distribution. Nevertheless, it is expected that the underlying distribution that generates the data in many dynamics, naturally changes over time as they generate data continuously and with varying arrival rates. These changes are referred to as concept drift (Debiaso Rossi et al., 2021).

The quantitative data collected was the recorded responses to both the open ended and close ended questions (Glaser, 2013; Maxwell, 2021). This strategy is considered acceptable regardless of the size of the study (Creswell, 2023). The survey consisted of three multiple choice questions and one question based upon the Likert scale and two closed questions.

The feedback questions were modelled on two themes. Theme One: The value questions – to explore what the participants thought about the notion of online learning that is characterized reduces the need for a local physical classroom. Theme Two: Feeling questions – to explore the participant's experiences and emotional responses to online learning.

QUANTITATIVE DATA

The goal of the quantitative survey was to collect responses from as many users as possible on a given date (February 2023). A user was defined as a health care worker who had accessed the foundation model of the W.I.L.F. The survey was completed as part of the programme to allow for access to the enhanced section of the learning. This was designed originally to ensure that the learning was appropriate for the learner and to obtain information for improvements to the framework.

The sample of users was determined by the available numbers. The participants were aware of the data being available to researchers when gaining primary access to the Ko Awatea website. All health professionals were able to participate as the website does not

differentiate between roles. It is recognised that the learning would be of little value to those who were not working within a professional scope, highlighting that the scope of practice is not applicable to the health care assistant or support worker.

The data was then triangulated to give more detail and balance to the situation, following this the secondary retrospective data consisting of written feedback was analysed, with the focus of engagement, improvements, and feedback to access and/ or the content itself. For many this was considered a new way of learning a clinical skill without the face-to-face element. There was primarily an elevated level of interest that reduced overtime but remained consistent with minimal advertising of the learning. The utilisation of secondary data provides an opportunity for the researchers who may have limited time, opportunity, and ability to undertake primary research (Creswell, 2023; Glaser, 2013).

The quantitative data collected focused upon time taken, area of practice, role, and use of further learning engagement. The qualitative data focused upon engagement through questioning including difficulty and generalised feedback about the learning.

The quantitative analysis questionnaire results were examined with the data from the Likert scales given a score that is then “coded,” creating a contingency table to demonstrate each module’s feedback, engagement, and recommendation.

QUALITATIVE DATA ANALYSIS

The questionnaire used a self-completion method based upon the Likert scale. The feedback form was predesigned for the purpose of the online learning but was found to provide sufficient information to respond to the research question. Furthermore, the utilisation of the feedback as data can allow future longitudinal research.

The questions asked utilised a closed question format with a Likert scale response. The Likert scale is widely recognised as an expedient in quantifying abstract constructs such as measurements of engagement. It is utilised to quantify abstracts of qualitative data, such as perceptions or opinions (Alabi & Jelili, 2023; Celen & Aybek, 2022). Use of the scale has also been associated with the use of thematic analysis and encouraging to the novice researcher (Peng et al., 2023).

Closed questions formatted in this manner are seen as allowing for comparability within the responses that are easy for the user and researcher to use and reduce the risks that are associated with variability (Bryman, 2015; French et al., 2019). Counterfactually, closed questions lack a sense of spontaneity in the answers given, resulting in a loss of insight.

The use of the Likert scale is subjective and can result in an overlap that is open to interpretation, resulting in arbitrary data (Alabi & Jelili, 2023; Bryman, 2015). To counter this an open-ended question with focus upon improvement to the education and other comments was included.

The inclusion of this qualitative question gives the user opportunity to answer within their own terms, given information that may not have been considered by the researcher and can further demonstrate the user's level of knowledge on the subject matter. Counterfactually, such information is time consuming to analyse and for the respondent takes greater time to complete often resulting in no information being given or the information being of very little value (Bryman, 2015).

Closed ended questions with Likert scale1 to 5 or agree strongly agree, neutral, disagree and strongly disagree included:

The delivery engaged me in learning required field.

The training is useful in my work.

I got what I needed from this training.

I am likely to recommend this training to my friend or colleague.

The qualitative question asked was based upon feedback to reflect improvement and phrased: *How could the training be improved?*

The questions were all asked with the focus of the training, demonstrating engagement, relativity to role, addressing education needs, and recommendation. The questions related directly to the module that was completed previously and were asked consistently after each module within the W.I.L.F. It is hoped that the scores for engagement would also reflect in the time the learners took to complete the learning and within the feedback provided in each component of the learning. It is also recognised that the other questions asked, focused upon engagement with the wording inferring such a positive experience.

The quantification of a Likert scale construct is the summated score calculated by summing an individual's responses across the weighted verbal anchors for each item within the scale. A common procedure of generating "composite scores" is to calculate a mean-item summated score. This is an individual's "summated score" divided by the number of items constituting the scale or subscale thereby creating a mean-weighted score that falls within

the range of the values for the response continuum options (Alabi & Jelili, 2023; Bryman, 2015; Ribeiro & Lopes, 2006).

Within this chapter the use of questionnaires and how this affects the available data were discussed, it was also noted that use of the Likert scale can also create quantification of responses from qualitative data (Alabi & Jelili, 2023; Hutchinson & Chyung, 2023). Further focus was upon the available data and how this was used to create information that can aid in answering the research question. The following chapter discusses the next phase in the research process of thematic analysis.

THEMATIC ANALYSIS

The previous chapter discussed the gathering of data and subsequent analysis, with focus upon the quantification of responses. This chapter will discuss the analysis and identification of themes within the data.

The qualitative data was reviewed using thematic analysis. This analytical approach is common amongst researchers and evolves with the identification of themes and subthemes which can be represented in a matrix (Braun & Clarke, 2022). The themes and subthemes are viewed as recurring text that are then linked to data. The repetition may refer to recurrence within the data but to be identified as a theme the researcher is required to reflect upon the research and how the themes are identified. Criticisms of the approach include limited depth when exploring the subject areas under analysis, a leaning towards unsubstantiated subjective bias relating to in-depth interpretations, and description being omitted or not recognised however it is further noted that this bias is not unique to qualitative data analysis as any inferences drawn from quantitative data can also reflect bias (Braun & Clarke, 2022).

Thematic analysis allows researchers who employ the interpretive approach to give a description of the facts from the recorded data, utilising an interpretive positivist view. However, the overall goal of the use of thematic analysis is to interpret the research findings to effect further research, development and learning (Behr, Bandilla, et al., 2014).

The approach encourages the generation of themes from the data, and so includes an inductive element. The deduction entails a predetermined theoretical pattern. The themes that emerge can be used to inform more questions or further research (Braun & Clarke, 2022; Terry, 2021). It is acknowledged that the data can demonstrate blurring. All prior knowledge cannot be excluded and similarly, pure deduction without prior knowledge or acknowledgement of bias is also impossible (Proudfoot, 2022). The sequencing of the data, follows the approach demonstrated by Fereday and Muir-Cochrane (2006), which is “presented as a linear, step-by-step procedure” for the purposes of written clarity, though is in fact “an iterative and reflexive process” (p. 83) (Fereday & Muir-Cochrane, 2006).

The objective of thematic analysis is to identify the narrative of the individuals’ experiences within digital learning. The use of thematic analysis utilises a systemic coding framework to recognise the patterns related to the research question (Fereday & Muir-Cochrane, 2006). The approach allows for the generation of themes from the data: the inductive element, these themes are then combined, mutually enhancing one another (Proudfoot, 2022).The

strength of thematic analysis appears in the engagement with data that encourages further identification of the multiple versions of reality that we all hold. Thematic analysis encourages examination beyond the obvious links creating opportunity for greater rigour (Braun & Clarke, 2022).

Responses were analysed using the thematic analysis procedure described by Braun and Clarke (2022). The dataset was studied for common patterns and themes in participants' responses. The data was read carefully to identify meaningful units of text relevant to the research topic. Units of text addressing the same issue were put together into thematic categories and given provisional definitions. The same unit of text could be included in more than one category. Then, the data were systematically reviewed to ensure that a name, definition, and exhaustive set of data to support each category were identified.

It was noted that there were four themes and eleven sub-themes identified that can be related to the barriers to the use of digital education. These were analysed using thematic analysis to identify any patterns of meaning in the data. The available data related to 398 users of online learning in a period of 6 months, from November 1st, 2022, to April 15th, 2023. Some of the codes identified were considered vague or irrelevant, an example is those that gave thanks or praise.

THEME RESULTS TABLE:

Table 1:

Code	Theme	Subtheme
• Online • Interactive resources • Access, • Video length (positive & negative) • Learning style • Information technology issues • Personal preference	Digital literacy	• Information technology issues • Access • Interaction
• Information • Quizzes, • Knowledge, • Case study, • Scenarios, • Feedback, further learning • Learning styles	Pedagogy	• Learning style • Delivery • Feedback
• Knowledge	Learning style	• Information • Digital access ability
• Wound management • Examples/ definitions • Care planning • Knowledge	Nursing	• Evidenced • Knowledge
• Recommendation • Praise • Repetition • Access • Evidence based. • Policy driven. • Tools, Algorithms, more learning requested.	Quality	• Policy • Recommendation • Tools

Many recommended the learning, but counterfactually many also cited issues associated with digital engagement and the associated learning styles. Suggestions were made to increase the knowledge testing, relate the information to real life situations through case study and allow for personal reflection. This segued into the second identified theme of learning styles with the associated subthemes of technology issues and personal preference of non-digital delivery or engagement opportunity. The final theme was most interesting as a researcher with the focus of quality of the learning.

Quality of learning is often associated with the nursing model of evidence-based care, with the reinforcement of policy driven care which by default is also evidence driven. Counterfactually, the inclusion of recommendation of the use of tools and algorithms to ensure continued evidence-based care was surprising for the researcher. Such tools are recognised by but not used in the New Zealand woundcare community due to cost but also due to the perceived impact that they will have on the autonomy of woundcare providers (Keane & Topol, 2021).

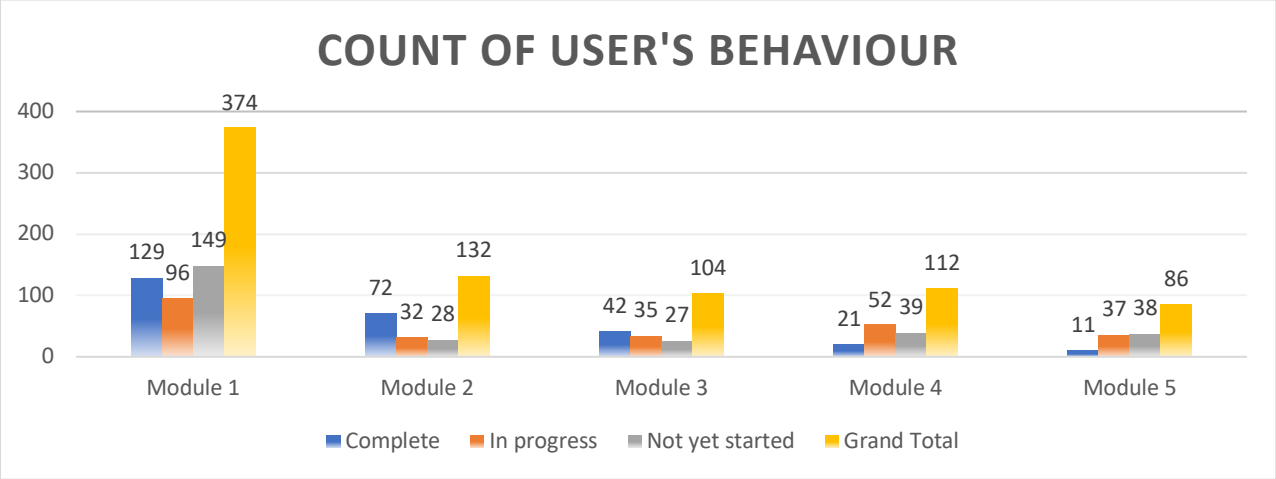
The recommendation for the learning was overwhelming with a majority stating that they would recommend to others. This was also reflected in the engagement numbers increasing over time. Opposingly, the quantitative data reflected that the number who completed all five modules of the 6-month period was reducing. It was noted that many had registered to start the learning but had not yet taken the step to commence it.

The data suggested that the learners were more accepting of digital engagement opportunities with the consistent engagement, but also reflected in the number of hours taken to complete the modules. The number of hours that were used to complete the first module subsequently reduced to approximately 35% of the original time spent when compared to module two. However, this appeared to increase slightly for module three and reduced again for modules 4 and 5. One possibility is that this occurs due to the innovative approach to learning becoming familiar and acceptable as a form of learning. Other reasons can be attributed to knowing where to find information at a time when required. Opposingly, however the reduction of users over all five modules suggests that the learning itself had a reducing influence in the long-term setting but is inappropriate to the research question or perceived need, despite this the qualitative feedback remained positive.

QUANTITATIVE DATA RESULTS

It was noted within the user's behaviour that despite registering, 40 % of users did not commence the online learning, and 35 % completed all the learning within the module and gained a certificate. The remaining numbers are still progressing through the module at the time of data gathering completion. The users appeared to have been new graduates and those that were directed towards it by clinical educators. It can be suggested that the spikes in learning numbers could correlate to the new entry to practise intake in February, as the W.I.L.F programme is part of the curriculum for this group at Waitemata explaining higher uptake from the new graduate programme that is based at Waitemata.

This number demonstrated a degree of the Gartner hype cycle with many engaging with the primary module and subsequently decreasing but remaining consistent in the engagement. It is also suggestive of the technology acceptance model (Geddam & Gowd, 2023; Muhlroth & Grottke, 2022)



Despite the engagement numbers reducing over the number of models, the combined number of those presently using and those that have completed the learning, remains greater than the number of those registering for the course but not commencing. This is also reflective of those that have engaged with learning by autocratic direction and not due to their own desire. Such direction is often attributed to the leadership that is demonstrated to the learner. Counterfactually, this may also suggest reactionary learning or learning in response to acute need. In the absence of robust qualitative data that can give more information this remains speculative.

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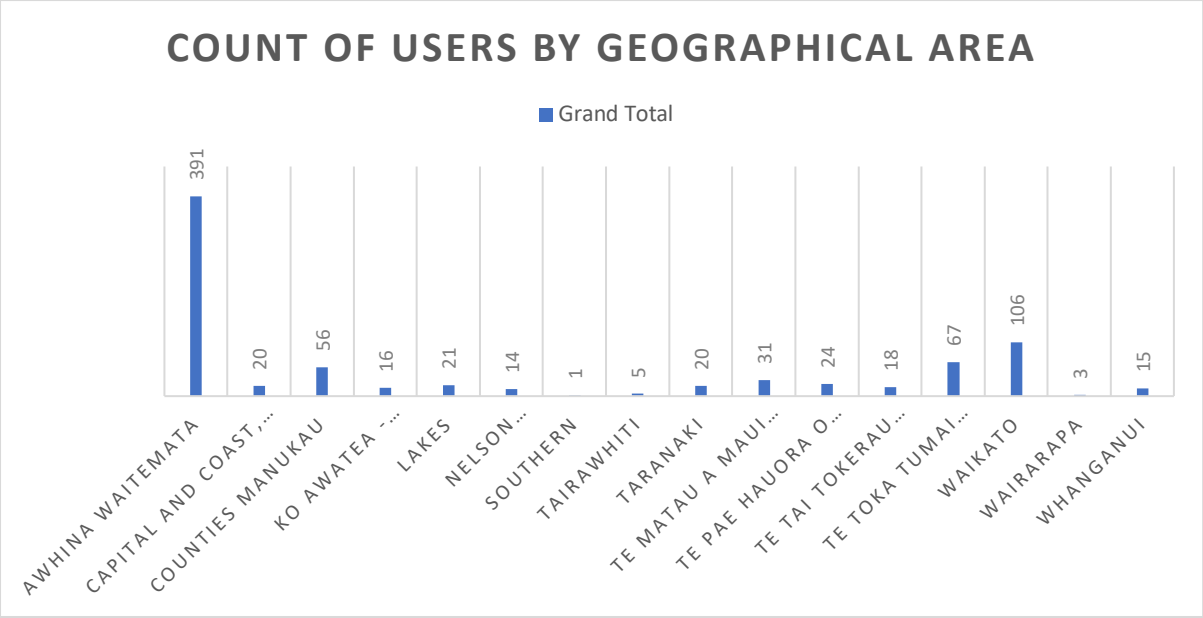
It must also be considered however, that although health professionals request learning, they are only accessing it when the professional registration requests them to complete mandatory learning hours, resulting in registration for learning but not actioning it as shown in the data when no longer required.

The adoption of education and acknowledging its value to practice is difficult. Individuals must change behaviours to ensure that they remain engaged with their professional goals. For health care learners, value is seen as a combination of convenience, reduced cost, and accessible education that can result in better healthcare provision. However, the data that is provided indicates that engagement with learning is reduced over time. It is the author's experience that this also occurs with face-to-face learning situations with approximately 20% of registrants to woundcare education face-to-face study failing to attend, however, further data would be required to confirm this.



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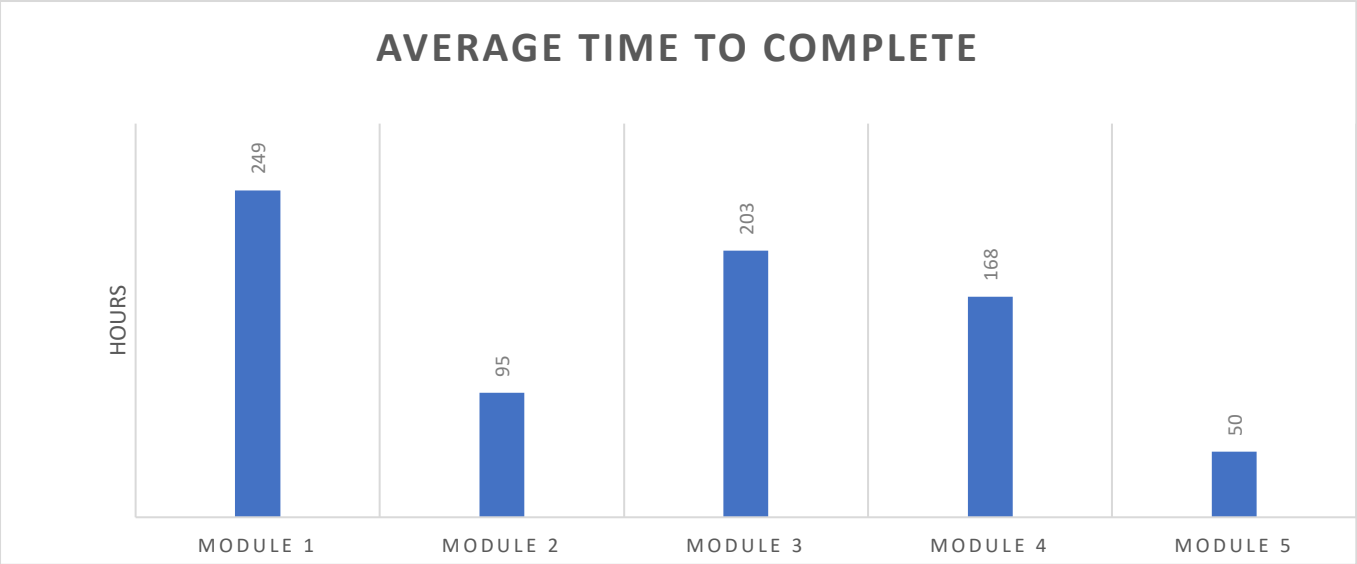
Demonstration of digital leadership is interpreted by the data of geographical areas. Most of the industry experts were recruited from the Auckland Metro region, the number of users from this area can be attributed to the digital leadership having been displayed by the area's industry leaders. Other rationale for the variance includes the conception of the programme being in the Waitemata district, another probable reason is the introduction of the programme at the wound care sessions held in this area by the W.I.L.F creators. It is suggestive that the increasing numbers are reflective of the recommendation of learning reviewed in the qualitative data. It was also noted however, that further industry experts were

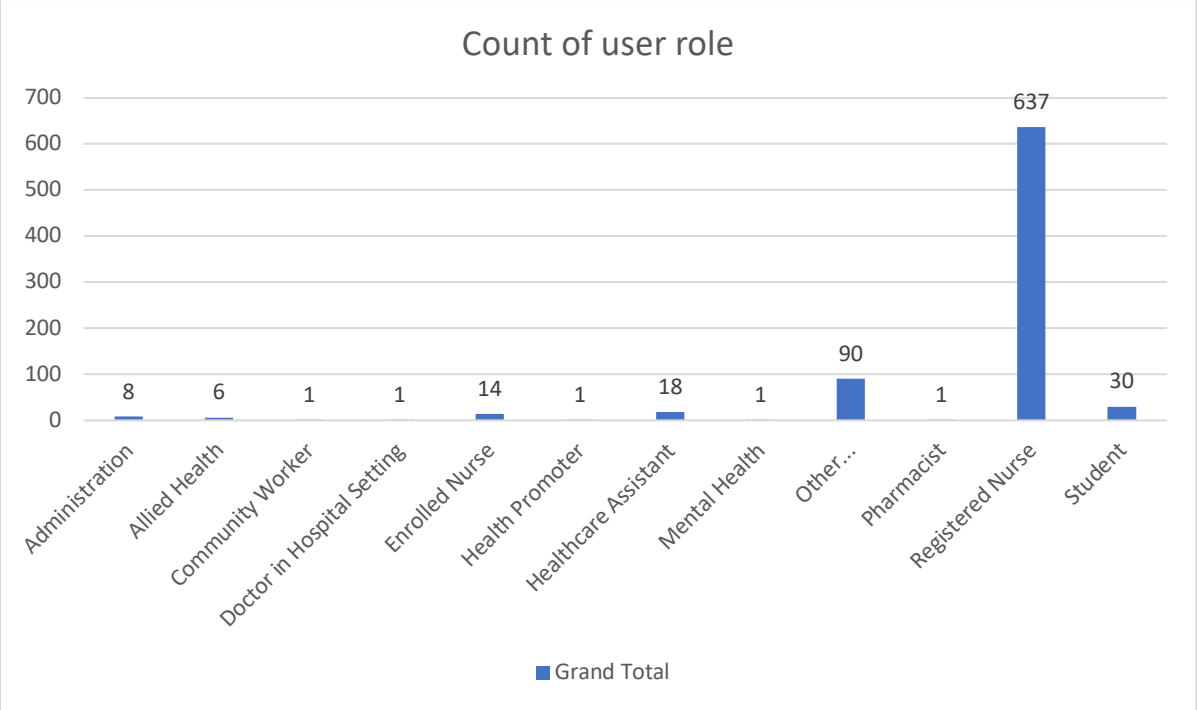
engaged when seeking endorsement from national industry leaders which can account for the differing area engagement.

The endorsement or accreditation of clinical or industry leaders of the learning creates by default a confidence. Furthermore, it can develop a sense of self pride in having achieved the learning criteria. Counterfactually, accreditation of digital learning requires its own research as to how it affects individuals and to fully understand whether accredited status really makes for a better clinical education (Nkomo et al., 2021; Sellars & Clouder, 2011).



It is notable that the average time to complete also reduces over the modules. Module three holds an increased amount of learning and quizzes. Therefore, the average time is increased but it is noted that this is a substantial number for an average engagement. This data in part is dismissed due to the large numbers who appeared to login to the system and not log out for several weeks creating a higher-than-average number that is inconsistent with the remaining modules.

Over time the learners who have completed the modules appear to have adapted to the digital learning system and this can be related to the technology acceptance model. Counterfactually, it can be inferred that the incomplete modules can be attributed to the users who have not adapted to a digital learning system.



The data seen demonstrates the differing roles of those using the digital modules. Registered nurses are most of the users, which reflects their role within wound care. “Other” can relate to nurse managers, health coaches or health professional educators including industry specialists such as those who work for product developers. However, another large group are community workers. This is reflective of who is providing the face-to-face care in the rural and community settings of NZ. It is important to consider the rise of the untrained or non-registered staff who despite not having a professional body appear to have a sense of obligation to understand their client’s healthcare needs (Cornish, 2020). Counterfactually, community worker can also be the nurse within the PHC setting. When creating a Ko Awatea login there are choices that can be made to describe the users’ position or work environment. Many nurses who work in urgent care or GP practice also consider themselves community workers, creating a mismatch in the data. However, for the purposes of this research it is noted that a majority of woundcare is being performed in the community or PHC setting following accidental injury or surgical intervention.

There appears to be a correlation with the learning completion and the setting of the user’s practice. An increasing number was working within the PHC setting indicated by “other.” This area traditionally has issues accessing learning (Martin et al., 2022).The digital delivery of the learning encourages equity to access, irrelevant of role or location. Counterfactually, the data also indicated that for some, engagement was difficult to negotiate with learners

identifying problems with technology and internet connectivity. Such issues can be compounded by a remote location and lack of Information Technology (I.T) support.

The community health care setting is often staffed by experienced nurses' who by default older. The aging nursing workforce may possess preconceived or a perceived barrier to online continuing professional development, including inadequate support, limited resources, and course demands. This reflected in the experience of learners and is further supported by the fundamental knowledge that the older workforce does not possess any formal I.T training and have limited knowledge of online learning.

Despite woundcare being responsible for approximately 30% of patient's interactions, a comprehensive approach that is viewed as the evidence based best standard of care is not reflected in this information. The burden of woundcare is well documented and is responsible for over eight thousand nurse contacts in February 2023 at Waitemata alone. Registered nurses provide face-to-face care, but it can be presumed that due to the spread of engagement this would reflect the roles of those working in health care.

Digital education has been noted to be effective in enhancing clinical knowledge and skills in relation to medication administration, reduction of errors and fundamental skills such as infection control (Nurse-Clarke & Joseph, 2022). It is recognised that the learning is evaluated from a learner's viewpoint, with the impact upon patient care not being measured. The online learning evaluation forms indicate improvements in knowledge, competence, and confidence in practice.

Truly holistic care involves facets of the multidisciplinary team which is reflected in the wide spread of professions noted. Recognising clinical knowledge provided by the greater multidisciplinary team can ensure safe and effective wound care. Opposingly, rural community workers or those that work within small practices have limited support and minimal referral opportunities. Creating an accountability or responsibility for all aspects of wound care, therefore requiring knowledge and skills in all areas.

The digital engagement with accessible online learning encourages equity to access, irrelevant of role or location. The data also indicated that the delivery mode was difficult to negotiate, with learners identifying problems with technology and internet connectivity. Such issues can be compounded by a remote location and lack of information technology (I.T) support.

The data has demonstrated several themes as barriers to digital learning acceptance and engagement including poor digital leadership, digital illiteracy, digital inequity, and digital

learning style. The following chapter aims to create further understanding of how the data relates to the use of digital education for health professionals.

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DISCUSSION

The literature search, authors knowledge, data collection and thematic analysis have created an increased knowledge base, the following chapter discusses the research and study with focus on answering the research question.

Patients depend on a nurse's ability to recognize and respond to changes in their condition. Clinical judgement involves the process of clinical thinking and developed clinical reasoning leading to the clinical judgement. This process requires a nurse to recognize patient cues, signs, symptoms, and critically analyse the data. This is followed by making appropriate decisions to optimise patient outcomes (Kinyon et al., 2021). A health professional is deemed competent when an authenticated assessment of clinical performance is demonstrated with clear and objectively measured components that include progressive performance (D'Aoust et al., 2022). Such competency assessment however, cannot be performed until criteria (set by the assessor) has been completed such as an online learning module to ensure understanding and rationalisation in using such skills (Bryant & Posey, 2019; Dreamson, 2020). Clinical competency validation is essential for advanced practice education and public accountability recognising that the foundation for developing nursing interventions starts with clinical competency (Kinyon et al., 2021).

The use of clinical competency validation within clinical education can be viewed as a guarantee for ensuring public accountability for competence and readiness for both supervised and unsupervised practice (McCrossan et al., 2022). Nursing education has transitioned to a competency-based education, as seen in other health care professions such as medicine and dentistry, with reliance upon clinical nurse educators to teach and assess the competencies. There can be a knowledge mismatch between the expected and actual knowledge and skills of the learners, resulting in ineffective teaching episodes and therefore incompetence (Ruesseler & Walcher, 2011). The guidance of what creates competency can change depending on the clinical skill itself and the education designer. Such competency demands can create a disinterest in engaging with learning as this can be perceived as difficult or unbeneficial.

Prior to the 2020 Covid pandemic, education given by health authorities for specific clinical skills such as negative pressure wound dressing, were given in a traditional offline or face to face learning situation (Du et al., 2013; Hutchings et al., 2022; Wetzlmair et al., 2021). This period changed how education for health professionals was delivered with the recognition that time, ability, locality, and availability were limited. The style in which competency was

achieved rapidly altered, creating a mistrust in process and the education delivery. Such delivery needed to reflect the health professionals' needs and ability to attend (Abbasi et al., 2020; Eltaybani et al., 2021; Langegård et al., 2021; Thomson et al., 2021).

In nurse education, classroom-based lectures are a major part of the learning activities. Traditionally this has been a place for nurses to compare and contrast their work environments, learn a specific skill and ensure that practice is discussed with a view to practise change or development (Hung, 2017; Langegård et al., 2021). The approach is seen as autocratic as the environment can be dominating of the organisation's own systems or protocols, leading to reluctance to adoption of emerging practices such as digital learning (Langegård et al., 2021; Urstad et al., 2021). This is reinforced by the traditional lecturers' view that education in the classroom setting has superiority to distance or blended learning due to the face-to-face interaction. Allen (2020) suggests that minimisation of face to face learning encourages inequalities in learning (Allen et al., 2020), opposingly the use of digital tools for learning can create inclusivity of practitioners in rural / remote situations or those who are working in more complex environments (Bowsher et al., 2021).

The technological advancements that are occurring throughout all aspects of daily life have also encroached upon nursing, through the improvement of health organisations, enhancing work conditions and reducing costs (Honkavuo, 2020; Pepito & Locsin, 2019). They are also demonstrated in nurse education with the use of digital platforms to deliver learning (Keane & Topol, 2021; Litwin et al., 2022; Melling, 2020).

Educators have translated courses into online delivery based upon classroom delivery, with no reflection of digital pedagogy. The delivery of any education in a virtual domain must reflect the needs of the learner, be engaging and be focused upon heutagogy (Ross & Tuovinen, 2001; Zhang & Yu, 2023). Traditional pedagogy is focused within the concept of deep attention meaning a focus that is unaltered and able to ignore distraction (Markelj & Sundvall, 2023). Opposingly, digital pedagogy is based upon the ideal of hyper attention which is characterised by changing tasks frequently to maintain engagement and is cited as untrusted by traditional educators as it does not demonstrate the concepts of the valued cognitive learning mode that are viewed as required for effective traditional learning environments (Anderson, 2020). The use of tradition can create rationale for distrust in the competency of the learning and how it reacts to practise, resulting in a perceived lack of value being attributed to the learning itself (Honkavuo, 2020; Lumbers, 2019; Nikpeyma et al., 2021; Uprichard, 2020).

Engagement with education is not merely due to the delivery method but can be further related to the utilised pedagogy (Lippolis et al., 2021; Markelj & Sundvall, 2023). Presently, most digital education content is created by nurse educators who have minimal understanding of pedagogy beyond the traditional classroom approaches (De León et al., 2023; Keane & Topol, 2021).

Digital pedagogy is described as “the use of electronic fundamentals like multimedia, productivity applications, cloud computing, etc. to enhance or to change the experience of education and transforms teaching and learning to provide rich, diverse, and flexible learning opportunities for [a] digital generation” by De León (De León et al., 2023). It is suggested that to ensure engagement within the teaching itself, the educators or designers must have an understanding and demonstrate the skills that digital literacy and pedagogy require. This could result in targeted professional development.

The practice of education is considered an ever-evolving skill that incorporates individual experiences and continued dialogue to ensure the achievement of the plethora of diverse goals of the learners. The demands of digitalised education have resulted in a need for educators to reflect upon their delivery of education, redefining the goals of the learner to incorporate a digital lens (Aaron, 2023; Shabalina et al., 2015).

The pedagogy of many nurse educators is based in their own personal experience of learning. For some this is equal to a pure vocational educational experience of a hospital based training, for others the more recent tertiary based education that utilises a blended learning package of experiential hours and classroom based learning (Gan, 2021). The implementation of education, from a standpoint that has not been experienced prior to its creation can create anxiety, for both the learners and the educators themselves (Aaron, 2023; Wright et al., 2022).

Digital innovation has produced tools that aid the creation of online learning, including learning platforms such as Canvas or Ko Awatea. Such tools increase opportunities for both learners and educators to engage with learning at their own desired rate. However, the use of such tools is not guaranteed, with educators having to seek opportunities and learning themselves to use them, creating a barrier to their adoption and use (Lippolis et al., 2021; Schuch, 2020).

Transformation of the way people are taught requires an interdisciplinary approach that takes note of individual learner’s needs (Shabalina et al., 2015). Many learners have moved away from the traditional silence of the classroom to platforms of stimulation. Such individuals have been given the label of digital natives, who require rapid feedback and

multiple tasks to maintain engagement (Shabalina et al., 2015). Opposingly those, trained in a traditional classroom, are viewed as digital immigrants, and must be enabled to access education in a manner that they feel comfortable with (Thi et al., 2023).

The barrier is created organically due to the student's ability to identifying as both a digital native and immigrant (Maneerattanasak, 2021; Shabalina et al., 2015). Digital pedagogy can acknowledge the differences that may exist between digital natives and immigrants. Furthermore, it can bridge the gap by adapting strategies to meet the learning needs of all students within the exponential growth of digitalisation (Shabalina et al., 2015).

This creates a need for change in basic assumptions in the approach to education. The shift would ensure that the use of a digital pedagogy encompasses those that have traditional learning style. The use of technology to deliver, facilitate and create an education experience that displays quality and creativity that can suit all styles of learning but for the educator can take time and requires further skills to develop creating barriers for the educator themselves (Shabalina et al., 2015; Thi et al., 2023; Vuttanon et al., 2022).

The rapid adoption of online education, including the exponential growth of the "zoom" classroom, demonstrated that the digital education forum could be widely accepted. Counterfactually, the transformation of learning environments and the perceived end of the pandemic has resulted in many declining to engage with such learning, desiring a return to the traditional classroom approach. Such desire meets the needs of the few but delivery of learning using a digital pedagogy can create a more equitable approach to learning.

Utilisation of industry experts and highly trained practitioner to create a digital learning culture that meets the needs of all those accessing the platform can answer the need for professional and expert information (Kowitlawakul et al., 2022; Lippolis et al., 2021; Markelj & Sundvall, 2023). The aim of education is the transition of knowledge, digital pedagogy differs in that digital learning is deemed successful when the learning environment includes active learning with digital tools including reflection and critical thinking.

For health educators the development of an individual's critical thinking skills is often stated as a goal (Kamenšek, 2022). Educators need to question the goals of learning and how these goals can be achieved in a digital context. The subsequent digital education design should focus on creating learning tasks that reflect the goals in a responsible creative manner, giving immediate feedback, engagement, and application to practise (Anderson, 2020; Humaira et al., 2021).When considering woundcare these education goals are complex.

Within New Zealand, woundcare is required by a substantial proportion of the population, but no confirmed statistics were found. The plethora of people who are actively assisting clients in managing wounds notes that the education received by these differing groups, their locations and understanding can vary dramatically (Seaton et al., 2020; Turin et al., 2022). Intuitively, it is presumed that the need for woundcare knowledge is universal amongst healthcare workers. Further recognition is given to members of the multi-disciplinary who are assisting in the management of wounds in non-registered roles (Allen et al., 2020). Such roles receive minimal access to formal education. These individuals are often being directed to perform woundcare without fundamental woundcare knowledge (Burrow et al., 2017). This is further associated with digital inequality through minimal access to learning platforms or engagement with formal education due to lack of professional scope or previous education.

The provision of education to the PHC setting is increasing in demand and is associated with the reduction in hospital stay. Woundcare education, therefore, needs to be consistent, evidenced base and refute traditional education within the practice setting to ensure best practice (Bobbink et al., 2022; O'Dwyer, 2021). The use of digital education can provide evolving woundcare education and can be viewed as beneficial to those outside the tertiary care setting (Lumbers, 2019). The barrier here is not with the digital delivery but content related. Woundcare practices are also buried in tradition, with such traditions also being taught in practice (Esche et al., 2015). To ensure consistent woundcare education, reflects evidenced based changes, these traditional practices need to be addressed to create change (Cornish, 2020). Upon its inception the purpose of the W.I.L.F was to give equitable access to all those involved with woundcare including rural practices who may not have access to evolving practice education.

Rural groups have been long associated with distance learning and it was recognised from the data that most learners were not from rural groups, but groups who were limited by time when engaging with learning. It was therefore presumed that the limitations due to a lack of identification of learning needs and were self-imposed. Self-limitation can be translated utilising the data as lack of engagement or relevance to the individuals practice and epistemological belief. The level of belief directly affects engagement with learning, creating a learning process that is motivated and enquiring. Those with identified learning needs will engage with learning (Alt & Naamati-Schneider, 2022). Those that have a low level of epistemological belief seek little education using a self-determining or self-limiting stance to avoid it (Bocking et al., 2022; Thi et al., 2023). Such self-limitation can be attributed to fear, lack of knowledge seeking behaviour or lack of change management but overall creates a barrier to any learning (Bobbink et al., 2022; Kourkouta et al., 2021).

Using Self-determined theory of heutagogy, the learner is central and can control their own education, the learning is nor teacher or content centric (Gillaspy & Vasilica, 2021). With a heutagological lens the domains of the theory; autonomy, competence and relatedness are all prevalent within the barriers to engagement. The application of the theory when considering those that cite personal preference for traditional approaches, appears fundamental for those who feel uncertain or unwilling to adapt to change. This can also suggest a lack of control or autonomy of which they value above education without realisation. Such education is central to ensuring, learning, bonding, exploration reflection, and bridging to identified need (Appolloni et al., 2023; Gillaspy & Vasilica, 2021; Vasilica et al., 2023).

In the post Covid era, it is presumed that individuals have access and ability and skills to source digital information. Within New Zealand the access to the internet is at 95.9% (Digital, 2023).Digital inequalities have many sociodemographic, including age, education level, gender, culture, social class (Fond-Harmant et al., 2023; Litwin et al., 2022).The digital divide relates to access and connection. Māori or Pasifika, those in large country towns and older members of society have limited access giving a differing view to digital inequity (Digital, 2023; Fond-Harmant et al., 2023; Litwin et al., 2022; Matenga-Ikihele et al., 2023; Ritchie, 2020). Digital inequity is adding a further impact of healthcare knowledge and care having several areas of influence, including digital divide, lack of digital leadership, technology division, digital behavioural responses and mistrust (Beneito-Montagut et al., 2022; Blank & Reisdorf, 2023; Kuhn et al., 2023).

The literature search and professional bodies have an expectation that learning will be sought by the learners. There is a further expectation by digital educators that this can be online education. Such expectation can lead to refusal and digital mistrust with many citing the previous traditional approaches to be sufficient for their own needs regardless of innovation or invention or internet access (Gleiss & Lewandowski, 2022).

Mistrust can be developed from a lack of understanding, low acceptance caused by misinformation, fear related to the change that digitalisation is causing, lack of understanding and motivation to accept digital change (Gfrerer et al., 2021; Uprichard, 2020). Inequality in healthcare is often associated with health literacy or cultural disparities (Elers et al., 2021; Gunasekara et al., 2013; Wilson et al., 2018).

The utilisation of digital applications and wearable technology has developed exponentially in the last 5 years with many using smart watches or health trackers, an area considered acceptable and trusted (Avella-Rodriguez et al., 2022; Geddam & Gowd, 2023; Yang & Lee,

2022).The technology acceptance model recognises the perceived usefulness, ease of use and more importantly the individuals desire to utilise latest technology. The presence of these factors serves as a contributor to the acceptance of the digital innovations into society having been developed by Davies in 1986 (Davis, 1989; Zin et al., 2023). The model further recognises that without a perceived usefulness to the individual, the success of an innovation will be minimal (Geddam & Gowd, 2023). The model can be applied to digital education and is demonstrated within the recommendation in the data. As the learner experiences a sense of acceptance and perceives the learning as useful therefore recommending to others, demonstrating further social acceptance of the digital learning (Noh et al., 2022).

The technology acceptance model can only be applied when individuals have relevant technology to meet their needs. Digital leadership is required to ensure that individuals can embrace, evolve, and adopt such technology (Brunner et al., 2021; Brunner et al., 2023). The data also notes that the learners continued to display other learning goals including face to face or skill specific learning.

The model does not reflect how people utilise and access technology, as not all digital access is equal (Mahdi et al., 2018). Accessing online resources without appropriate equipment or knowledge can create issues, most access is via mobile device, limiting users' abilities to use digital learning (Fond-Harmant et al., 2023; Schlosser, 2002). Furthermore, many older adults have never received any education upon using digital tools and therefore lack confidence in doing so (Carmen et al., 2023; Schlosser, 2002). It is also suggested that with so much digitalisation within daily life many users wish to halt digitalisation affecting their learning spaces too (Hwang & Kim, 2022).

Users of digital education face technical challenges to connect to online learning, including training to use systems, physical access to internet connection, lack of educational support and the social isolation that can be experienced (Fond-Harmant et al., 2023). The phenomenon of digital divide is created by the unequal presence of digital tools and the ability of those to use them in the manner that they are designed to satisfy the individual's needs (Hass et al., 2023; Pokrovskaia & Garin, 2022). Counterfactually, sociologists describe the phenomenon as a type of social difference that relates to opportunity within daily life (Fond-Harmant et al., 2023; Turin et al., 2022).

The adoption of digital tools is challenging, durable change only occurs when users see value in doing so (Dorn, 2015) reflecting Amara's law. Amara's law suggests that society overestimates the possible effects of technology in the short term but underestimates them

in the long term. In the case of digital wound education, the short-term goals have been incremental and growth in acceptance and popularity demonstrates this. Many digital education tools when presented will fail but their use can affect the development of others to create targeted learning (Dorn, 2015; Nkomo et al., 2021). The rule however does not reflect the digital divide that is occurring with the expectation that the technology available will reach all, creating a further divide and barrier to adoption (Blank & Reisdorf, 2023; Maguraushe et al., 2022).

As increasing amounts of daily life are affected by digitalisation and automation, from the mundane of knowing the time in a differing time zone to the complexities of woundcare education (Blank & Reisdorf, 2023). Digital tools are viewed as giving targeted information. Such information adds layers of complexity to any organisation resulting in the need for effective leadership. Digital leadership is viewed as an interactive form of leadership that is collaborative, social, inspiring, and fostering autonomy and resilience (Claassen et al., 2021). The paradigm shift in strategy of leadership is due to the emergence of future technologies, and their ability to continually evolve with demands and to provide data (Gleiss & Lewandowski, 2022).

Digital change can be implanted with leadership that reassures and ensures that the ethical standards that healthcare workers abide by are adhered to (Wong et al., 2021). When applied, digital leadership can promote innovations such as digital tools or education and encourage new users to access and utilise them (Keane & Topol, 2021).

Prior to the Covid pandemic digital access to education was seen as optional with many accessing online resources only when requested. During the pandemic and the ever changing situation, digital education was considered the only option when requiring education in a majority of settings (Perrin & Wang, 2021). In the post lockdown period, digital learning is now viewed as an acceptable choice for further education due to the application of digital leadership during this tremulous time (Gfrerer et al., 2021).

The engagement with digital education appears to reflect the Gartner hype cycle. The cycle is cited as an evaluation tool for emerging technologies (Kondo et al., 2022; Mahdi et al., 2018).The cycle considers a holistic approach to assessment with focus upon factors such as the maturity of complementary technologies, social acceptability, usability, and development of an infrastructure that can directly influence the acceptance and use of technological advances, such as digital learning tools (Kondo et al., 2022). The cycle demonstrates the roles of both the users and authors or creators and how they pass through typical stages. The stages demonstrate the acceptance and more importantly the relevance

to practise (Dijkman et al., 2022; Mahdi et al., 2018). The cycle enables authors to compare their own understanding of a system to that of the user, demonstrating the relevance to the users and their acceptance of an implemented system (Muhlroth & Grottke, 2022).

The cycle demonstrates that when something is considered new or novel, such as an online free wound education tool, the innovation is triggered, moving to a phase of disappointment where the innovation or the learning does not meet all the needs that are expected. The cycle goes on to demonstrate a further level of realisation, followed by a trough of disillusionment where the learner recognises that more learning could beneficial. The slope of enlightenment, where the learner recognises the usefulness or benefits of such a tool, this results in the plateaus of productivity where the learner recommends the learning and it can be suggested utilises the learning in practice (Mahdi et al., 2018; Muhlroth & Grottke, 2022). The cycle is demonstrated in the increased engagement demonstrated in the user's login rates of the multiple modules data.

The engagement with any education can have minimal impact, the barriers that are identified by the users including technology access, lack of digital literacy or a fundamental apathy to digital learning are often dismissed by digital health creators (Uprichard, 2020). Digital creators have a desire to utilise digital approaches to address issues that have not been identified as requiring a digital solution. This has equated in a dismissal by users of changing the perceived norm. Such change requires a further change in behaviour, leadership, and processes from both the users and organisations to encourage acceptance (Smith et al., 2021). The value of the change and the plateau of productivity must be at peak to be accepted (Kondo et al., 2022) .

The plateau demonstrated through the quantitative data of recommendation, demonstrates that the information given in digital learning is trusted by those that utilise it. Trust is often associated with the personal relationship learners have with their teachers. Within the data and literature reviewed, learners cited poor experiences due to the lack of engagement with others and the learning, the inability to ask questions and difficulty negotiating the learning itself as rationale for lack of trust and a perceived barrier to the learning. It was presumed that the concept of trust was reflecting the content of the education, however this was not cited as an issue. It is therefore presumed that the utilisation of industry experts, the unbiased use of all available market product providers and recommendation by clinical leaders and users has created a trusted education environment that is supported, meets the needs of the user and is not a barrier to acceptance.

Trust is also questioned when considering many educators have returned to the traditional classroom models of learning which can effectively demonstrate an educator's mistrust in digitalisation itself (Humaira et al., 2021). By continuing to use a digital approach and engaging others to create an evidence-based learning experience, can creates new aspects of learning for both educators and learners that can exploit their digital adoption and create a further level of engagement.

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LIMITATIONS

The use of a non -probability sample limits the generalisability of the results creating an uncertain inference of change, as the sample may not accurately reflect the characteristics of the population. This can also create sampling errors and have potential biases by the utilisation of an unrepresentative sample. The use of secondary information from W.I.L.F may not have provided a comprehensive understanding of the barriers or acceptance of digitalisation that were studied, giving suggestion that the analysis may be limited by the availability and scope of the secondary data used. To gain deeper insight, conducting a more in-depth qualitative study would be beneficial. Furthermore, this could ensure that aspects of education including, trust, leadership and effects of recommendation can be studied further. Despite the author designing the feedback questionnaire, the use of it was for improvement of the learning and not for research purposes, indicating that this was not optimal for data gathering and analysis. The use of a qualitative methodology with interviews has the potential to provide a richer and more nuanced understanding, by allowing participants to share their experiences and perspectives in detail.

CONCLUSION

The continuing education of any health professional demonstrates professionalism and commitment to the values linked with healthcare (Agyepong & Okyere, 2018; Kourkouta et al., 2021; Nkomo et al., 2021). For nurses, these values also link to their individual professional development, standards of practice and accountability (Chen et al., 2022; Yu et al., 2022). It is recognised that the continuing congruence of education influences the professional practice knowledge of all health care professionals whatever their discipline (Bryant & Posey, 2019).

Each health profession whether collaborating, consulting, or working as a team, should have a deep understanding of their own role and contributions to an individual's care and be knowledgeable about the contributions of others, giving understanding of the patient's experience and reflecting truly holistic care. Communication can ensure the utopia of holistic evidence-based care (O'Dwyer, 2021; Teal et al., 2018). The continued evolution of nursing has resulted in the presence of hierarchy no longer being tolerated (Dang et al., 2022). When one group dominates an interdisciplinary conversation, important dimensions of individual and socially responsible care can be lost. Therefore, it is important to ensure that all education is offered to, and can be experienced by, the full multidisciplinary healthcare team and not just focused upon one core group (Abrahamyan et al., 2015; Cara, 2018; Teal et al., 2018).

The evolution of education to ensure a consistent and unbiased approach is reflective of the shift in mindset that is present in education leadership, that addresses multidisciplinary use (Gfrerer et al., 2021; Oducado & Soriano, 2021).The diversity of available learning platforms and recognised education providers, implementation processes and complex environment can create a lack of engagement due to the multiple demands made by numerous platforms (Urstad et al., 2021). The leadership styles that are present and the varying levels of stakeholder engagement with digital learning can be centric due to a lack of academic performance and disengagement demonstrated by the learners (Hietajärvi et al., 2022; Nkomo et al., 2021).

Health education value can be equated by convenience, reduced cost and accessibility that can lead to increased knowledge and better patient care. Counterfactually, digital creators value satisfaction through increased numbers of visits to the sites they create. Amara's law suggests that the effect of technology is overestimated in the short term and underestimated in its long-term effects, reflective again in the data obtained. Suggesting that the short-term

measurement of the wound education programme is insufficient in the snapshot of its use and like telemedicine or virtual consults will become more acceptable as the technology acceptance increases.

The exponential growth and acceptance of digital education within clinical settings reflects societal use of digital tools in all aspects of daily life. The barriers demonstrated by both the W.I.L.F data and the literature search note that a general disinterest in digital education is common with many utilising platforms only for mandatory education. Educators are starting to embrace the benefits of digital education, recognising how it can meet the need and has an equitable approach for healthcare workers and users. The design of digital education must use appropriate tools. The educator themselves must receive education to their use to ensure that a barrier is not created in the implementation.

A cautionary note is that the clinical governance of any online education currently is limited. This can be attributed to the exponential rate of change that is occurring within industry, added to the rate of acceptance, giving dismissal of the concerns voiced by the few being overlooked. Health education providers are often seen as leadership figures within health society. The provision of education within a digital arena is a logical step for such leaders but not all educators have the tools for digital academia. Furthermore, learners' expectations are that computers can provide the answers, but a digital tool can only develop the information that is given. The future may change this but presently educators must continue to meet the needs of the learners and invoke change gradually to maintain continued engagement.

To guarantee that all health professionals have equity in digital education could be considered a utopian dream. However, the aging workforce, recognition of digital influences and increasing healthcare needs, equates to the knowledge that education delivery needs to adapt to the demands that are frequently presented. Ensuring that knowledge is accessible, up to date and evidence-based can only be delivered in an evolving digital space. The influence of the industry leaders does not lessen with delivery, by using a digital approach, leaders can ensure that the people who are most affected by evolving education remain at its centre. The creation of digital pedagogy for the digital age can assist in breaking down the barriers, creating a personalised education that could enhance the practitioner and better patient care.

There are several barriers to adoption of digital education for professionals including, lack of trust in novel approaches, overestimation of the technology, digital literacy, digital inequalities, and an ignored need for specific digital pedagogy. Addressing these issues with innovation, digital identity well-being, safety and security can enable a digital future that

incorporates digital self-development (Elena et al., 2021; Poore et al., 2022; Turin et al., 2022; Uprichard, 2020; Urstad et al., 2021).

Digital technology facilitates access to information, the learner can be in control of their own pedagogy, creating clarity of learning goals and the possibility of further learning opportunities. Adoption and adaptation to professional digital health education is viewed as a challenge. It can demand a change in behaviours, and for organisations a change in processes for competency assessment and engagement. Durable change will only occur if the users see the value in doing so. Healthcare consumers value convenient, cheap, and accessible care that can lead to better health. When applied to professional education the same demands can be applied.

For future success of professional digital health education, the learner should be at the centre. Digital technology facilitates access to information and is a tool to ensure that the learner is central to their education journey allowing for exploration of the subject matter, collaboration with other users and the ability to reflect which is recognised as central to any health professional's learning journey.

The recommendations include the use of digital pedagogy being a priority to ensure the continued adaption and acceptance of digital education for any subject matter. To ensure that the content is accurate and evidenced based will require a well-structured curriculum, relevant to practice and encouraging the practitioner's engagement. Formats such as simulations, case studies, quizzes and discussion forums have been demonstrated as enhancing the learners experience and therefore should be used alongside multimedia elements such as videos and graphics to maintain engagement in the subject matter. Future opportunities may also include the use of artificial intelligence to assess the user's engagement and preferences of delivery learning style.

Another possibility is creating opportunities for tailored learning style delivery focussed on individual learning style preferences and a user centred approach. This will be able to accommodate those with presently identified learning needs which are currently considered such as dyslexia. Acknowledgement of learning issues will also ensure that the digital platform will have enhanced accessibility. This will require the ability for learners to access the learning through differing operating systems and devices.

The use of effective digital leadership can be viewed as the biggest change that is required for the acceptance of digital learning. The use of online, simulation and other digital tools will

only be accepted when the leaders of health education use them and display them as a tool that can successfully be adapted to meet the learning needs of health professionals.

The final recommendation is that the learning itself continues to develop and reflect evidence-based practice in both the design of the education and the information and research available by continuing the collaboration amongst wound care leaders and educators. This will ensure that the learning itself will develop a reputation as being highly valuable amongst health care leaders and learners alike.

The implications of the study are both practical and social. When taking a practical view, the increase in accessibility will shape the digital environment with limitless boundaries of possibility for knowledge acquisition. The digital world will therefore require equitable access to ensure greater accessibility across all aspects of the health care system.

The benefits of digital accessibility have been explored in this study for wound care. However, to gain a better understanding of the barriers to digital education a further and larger study utilising a mixed methodology is desirable with findings that are more generalisable.

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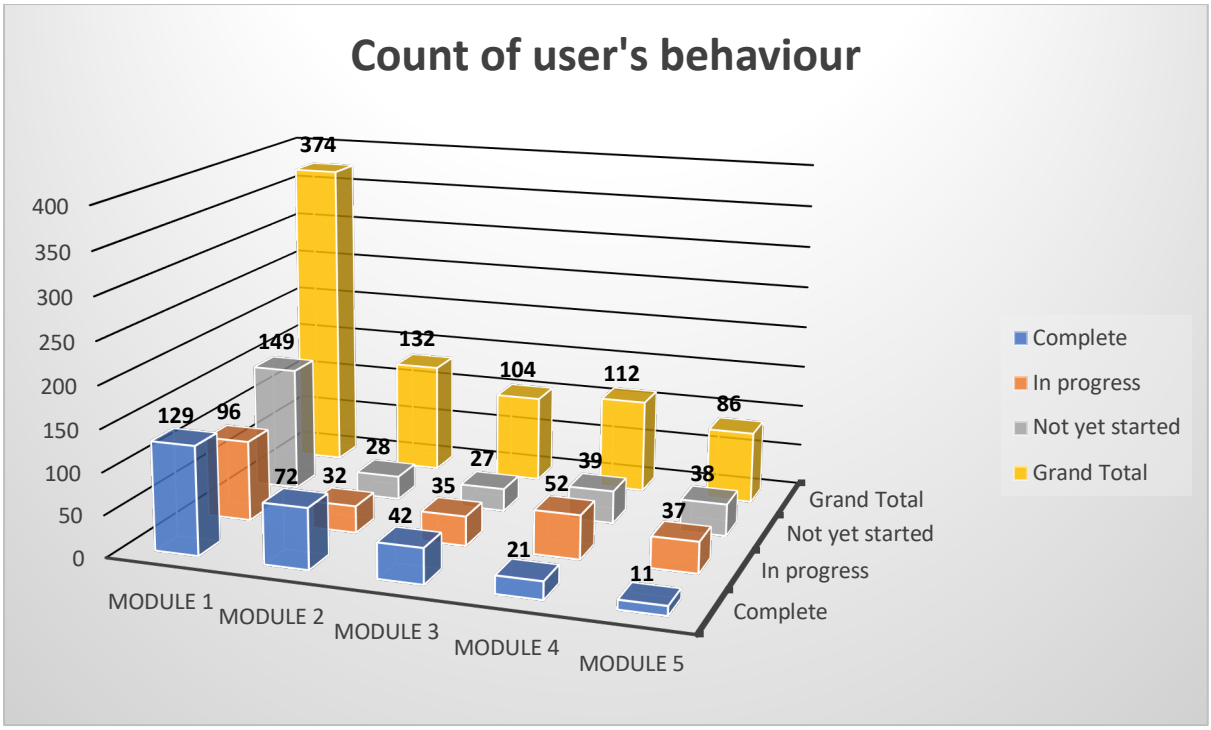
APPENDIX 1

Contents:

Table 1:



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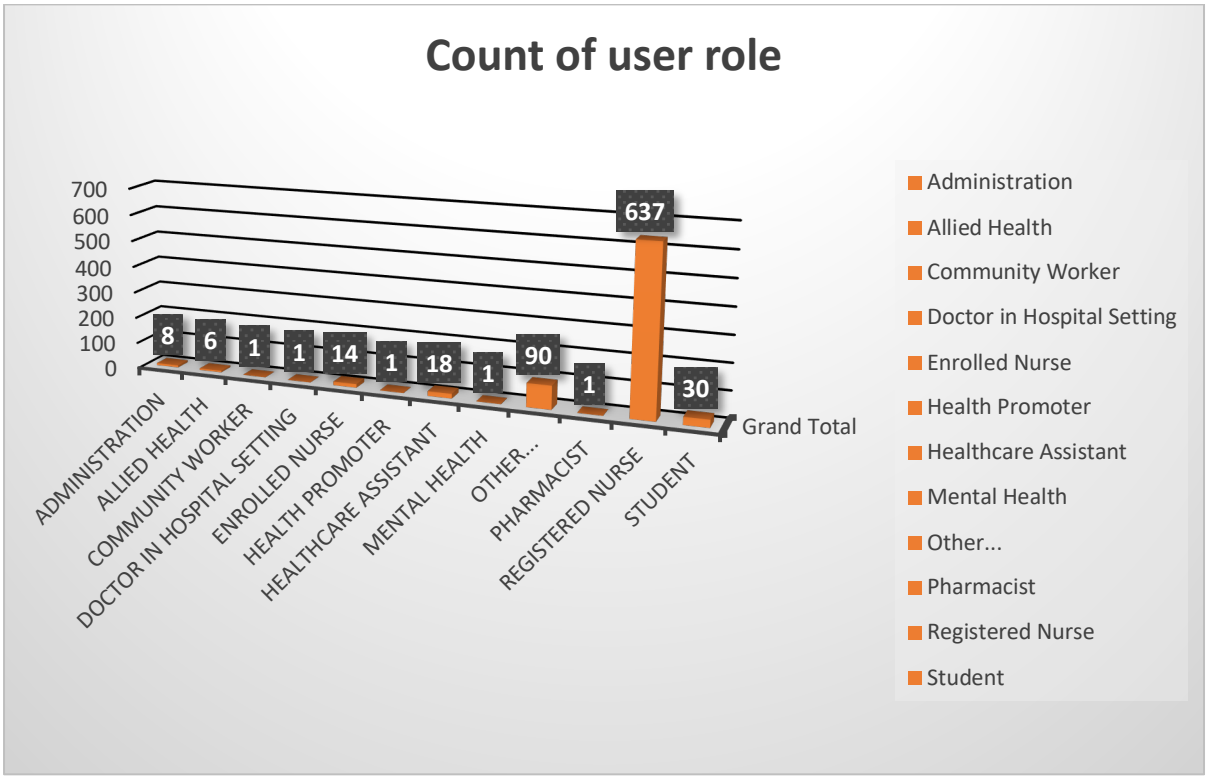

Table 3

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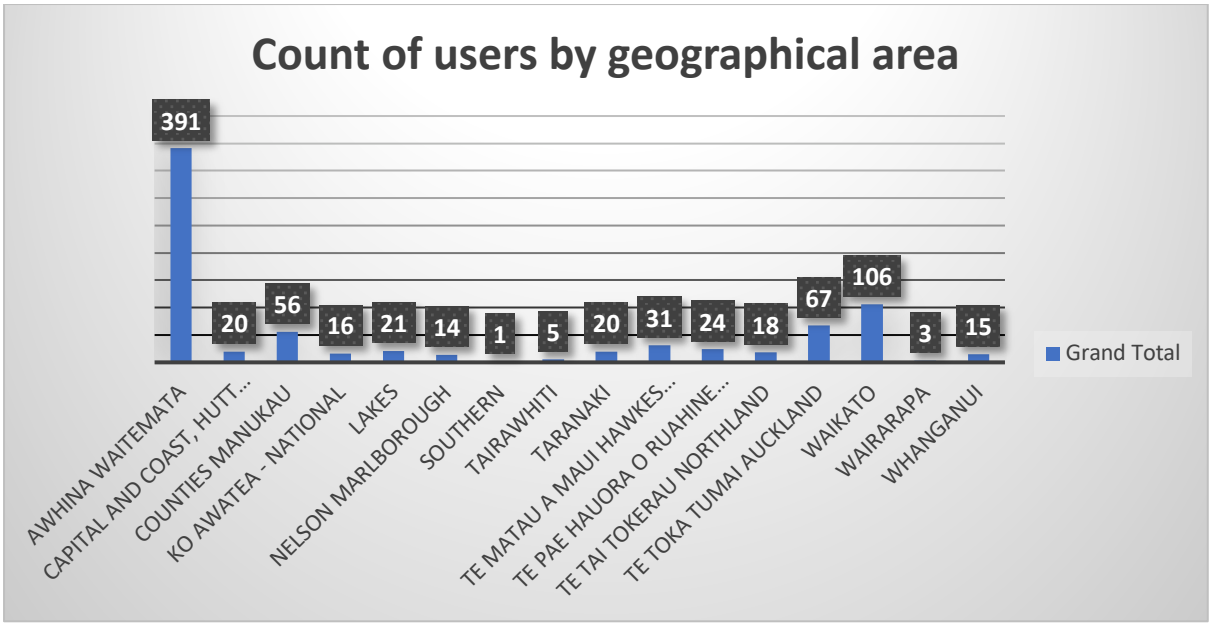

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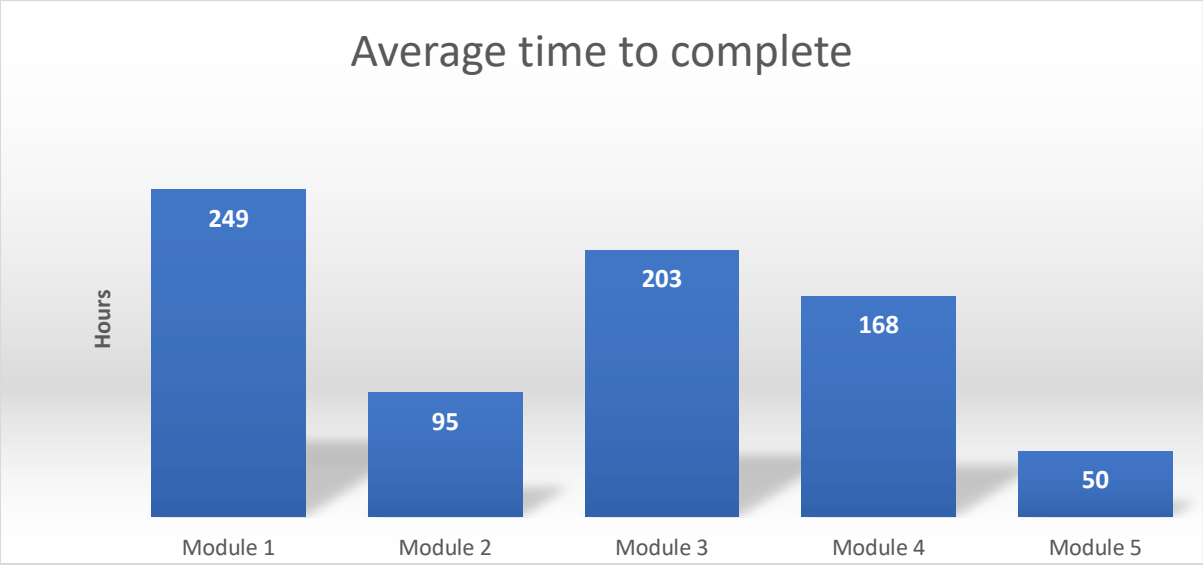

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APPENDIX 2

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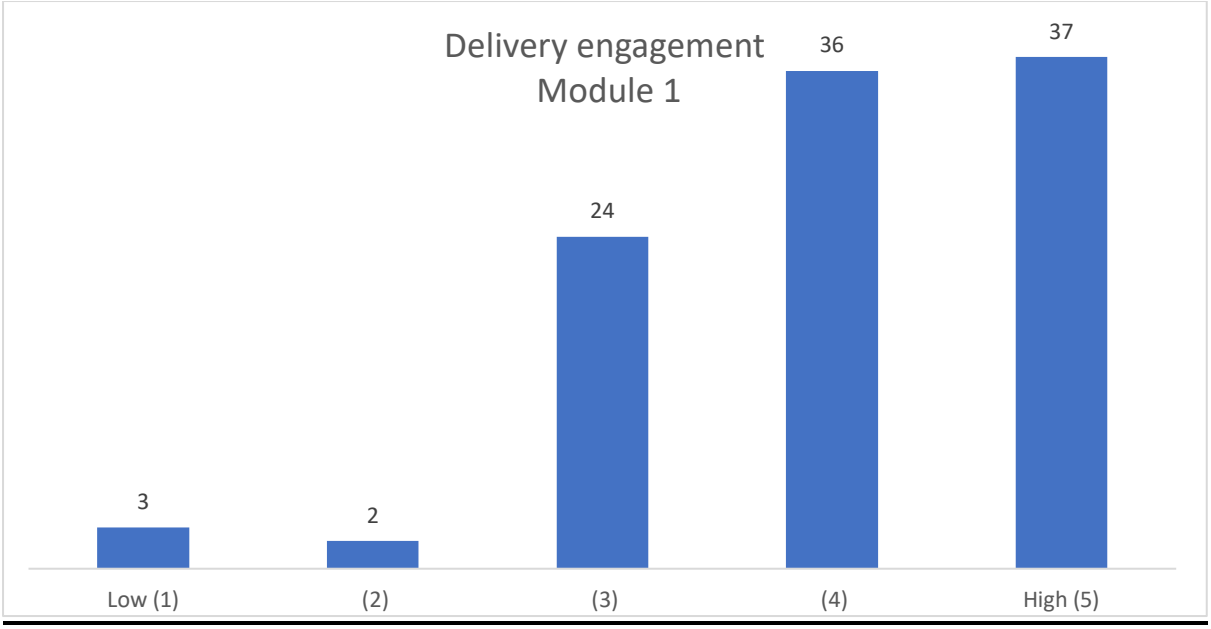

Table 2: Likert scale of usefulness results module one

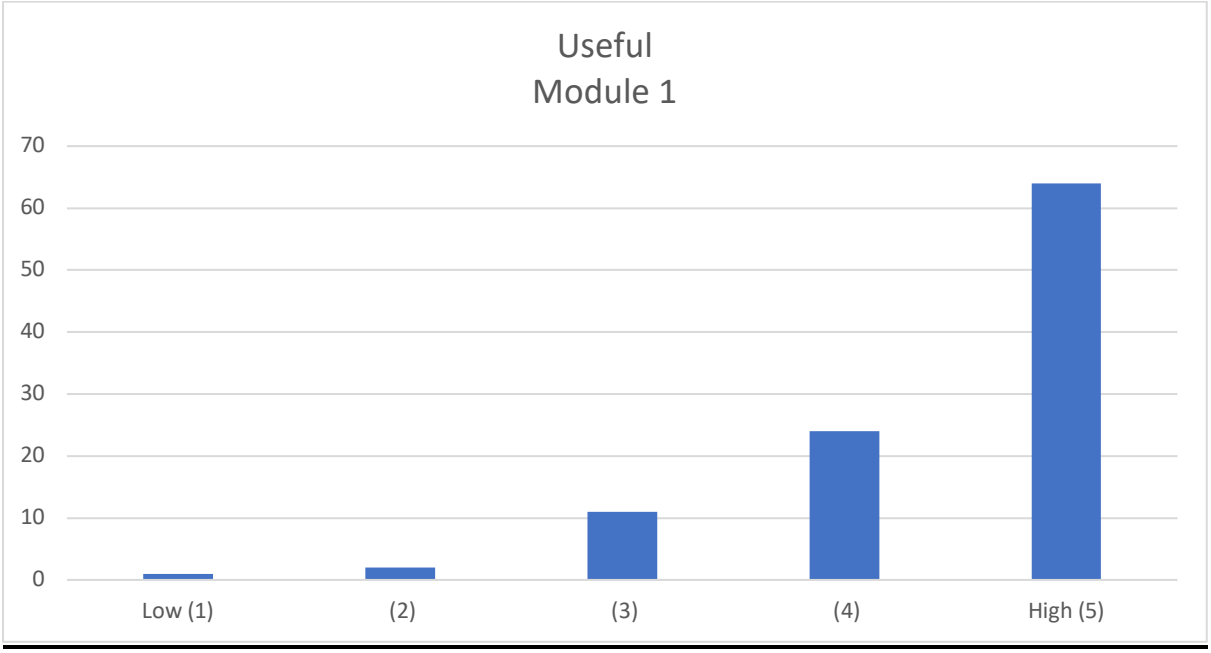

Table 3: Likert scale results of training efficiency module one

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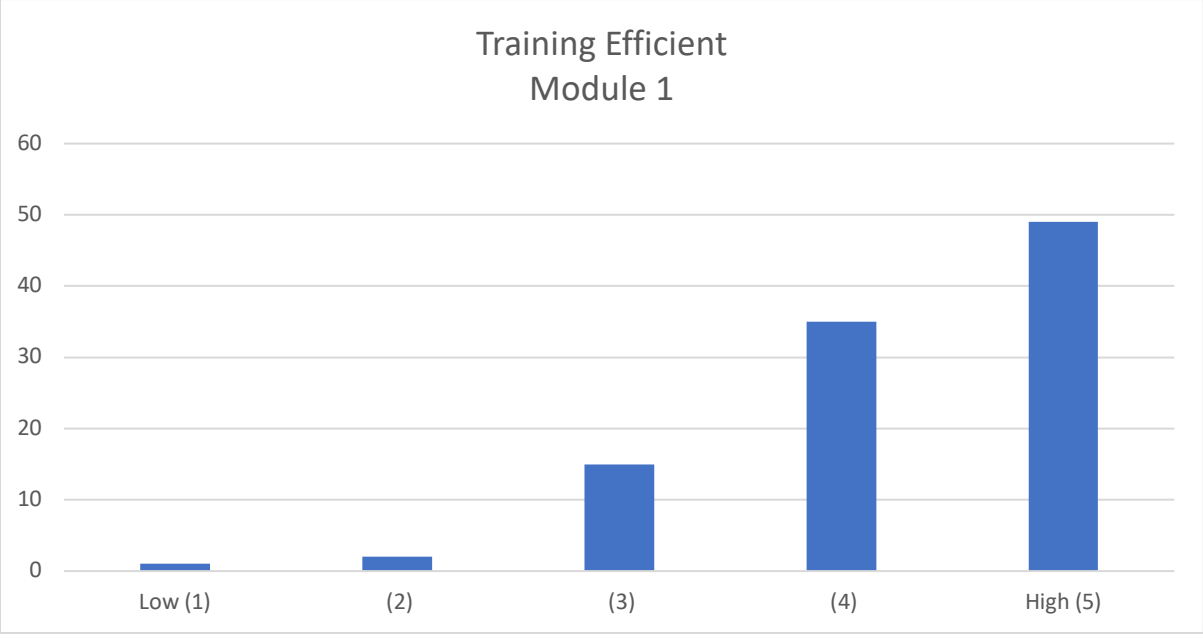
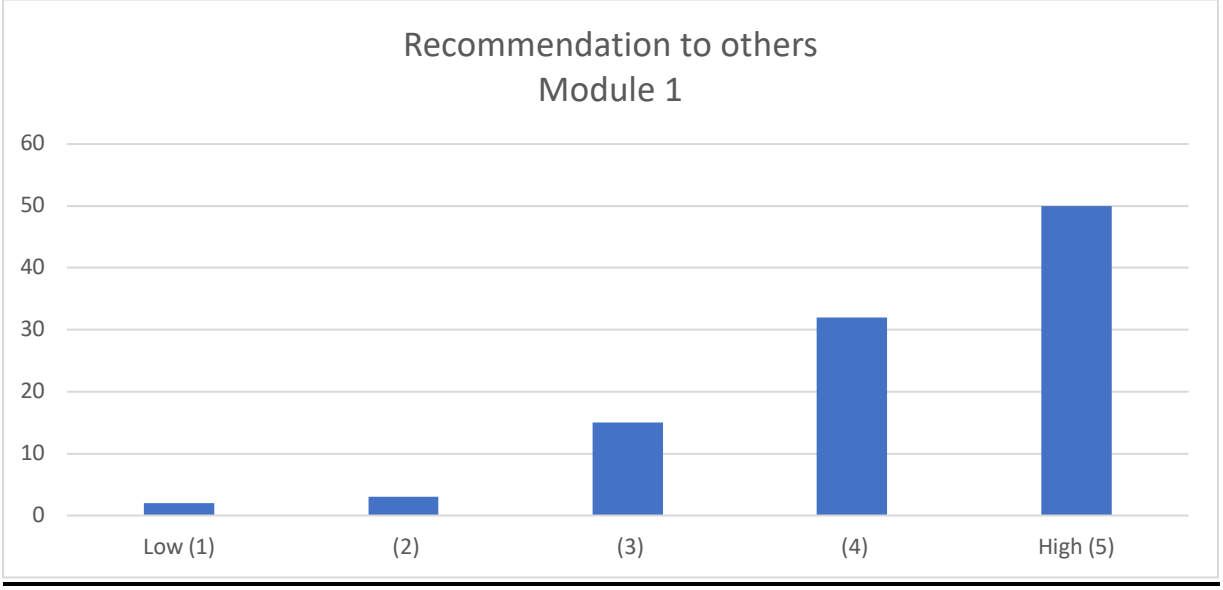


Table 4: Likert scale results of recommendation to others Module 1



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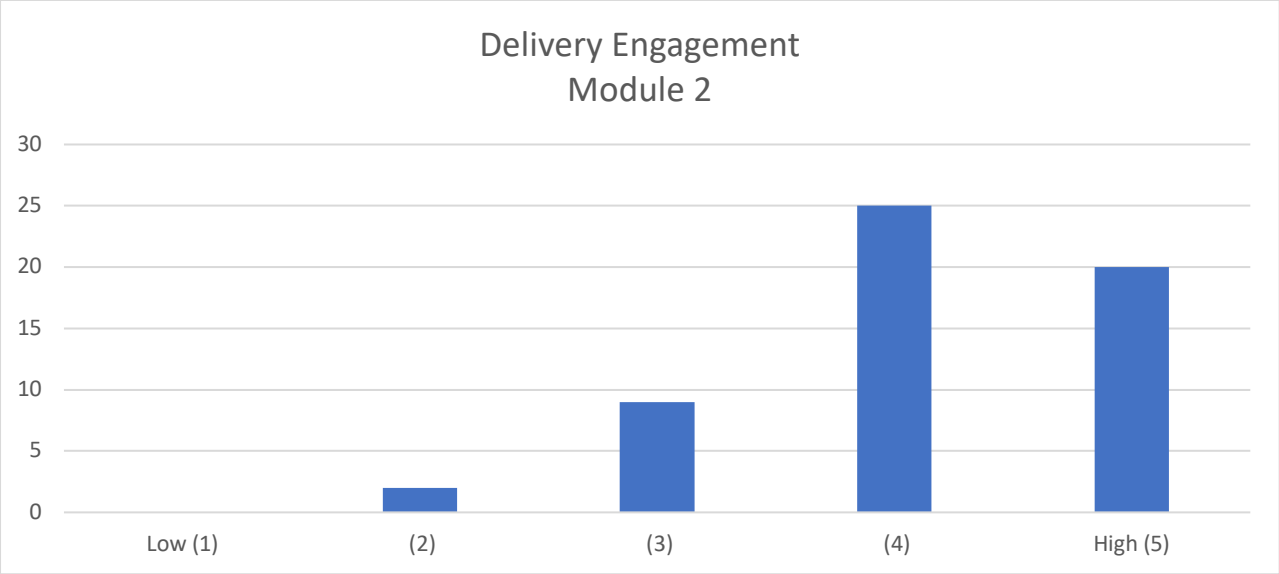

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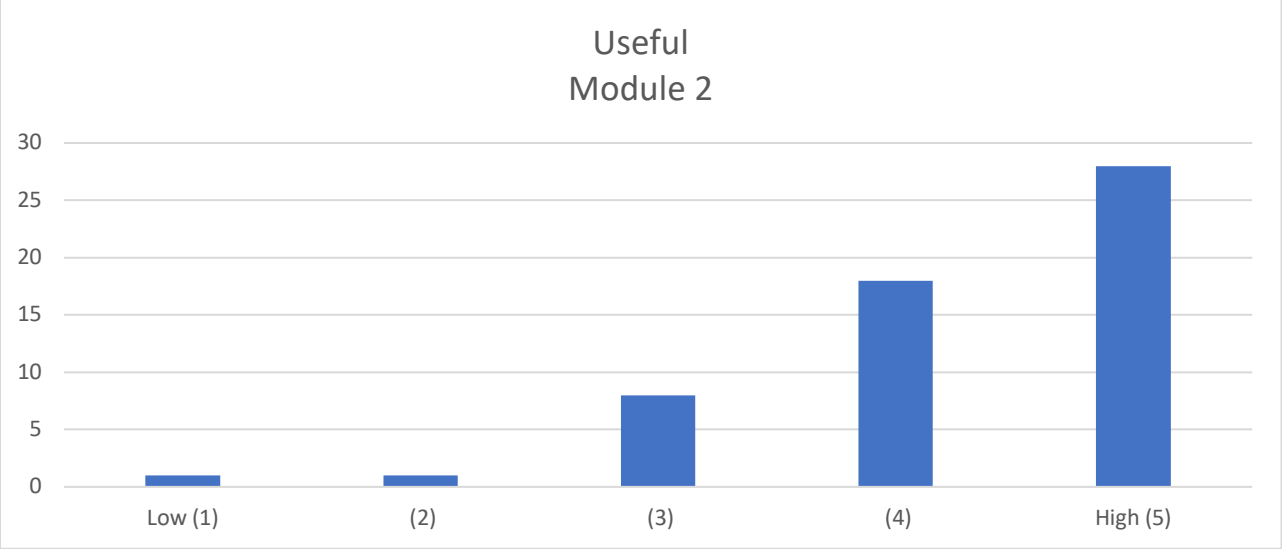

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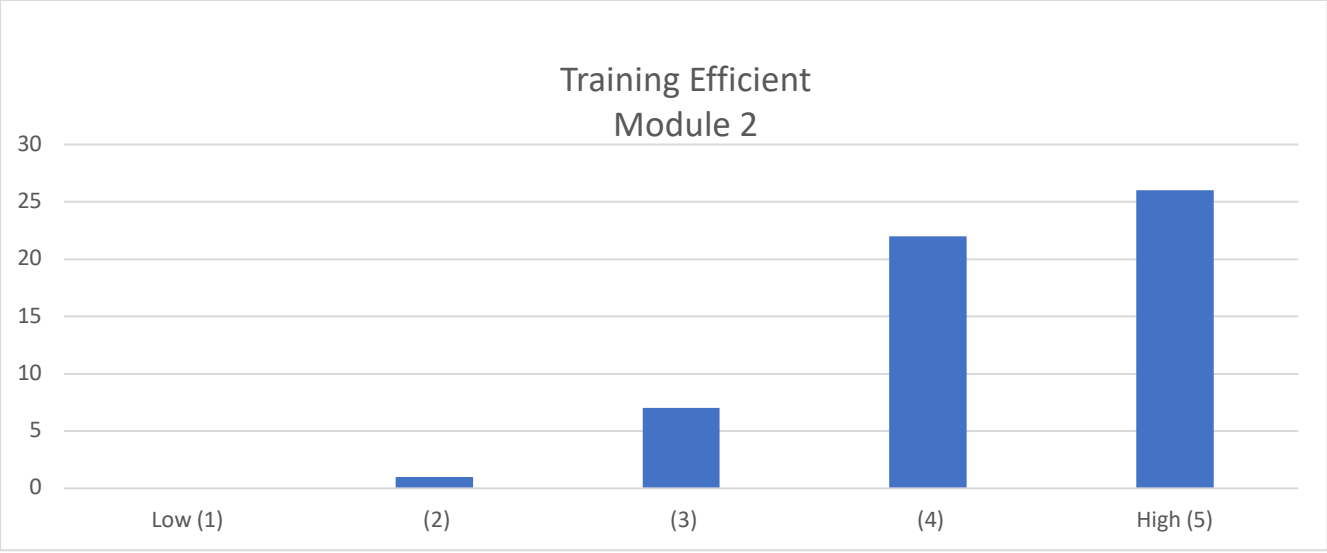

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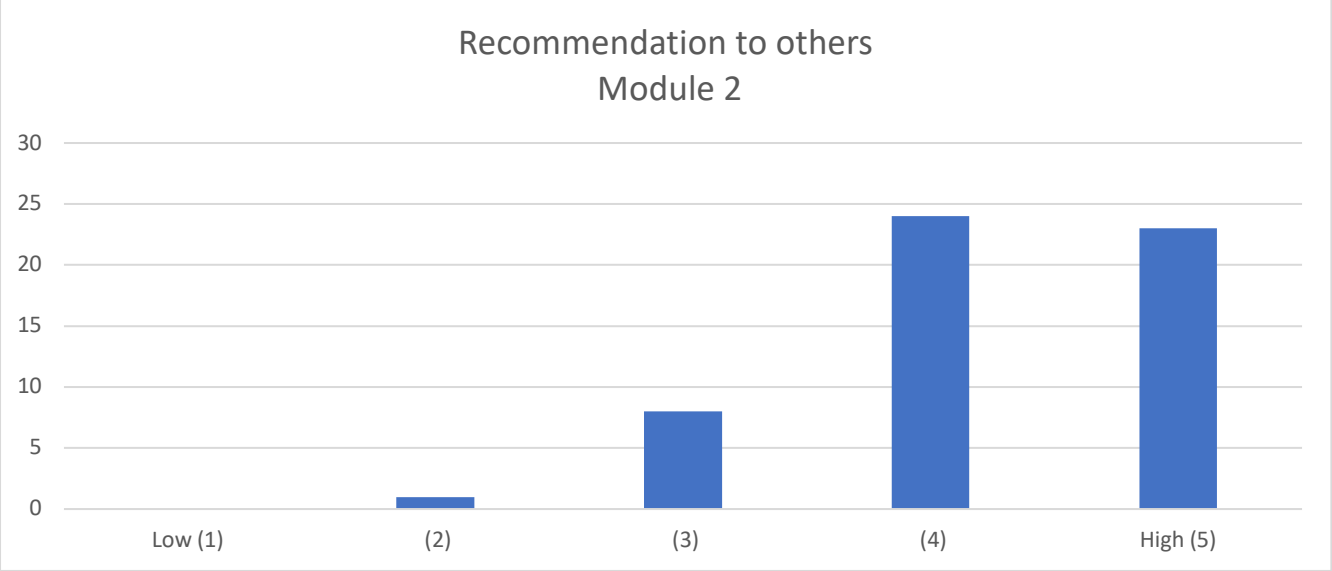

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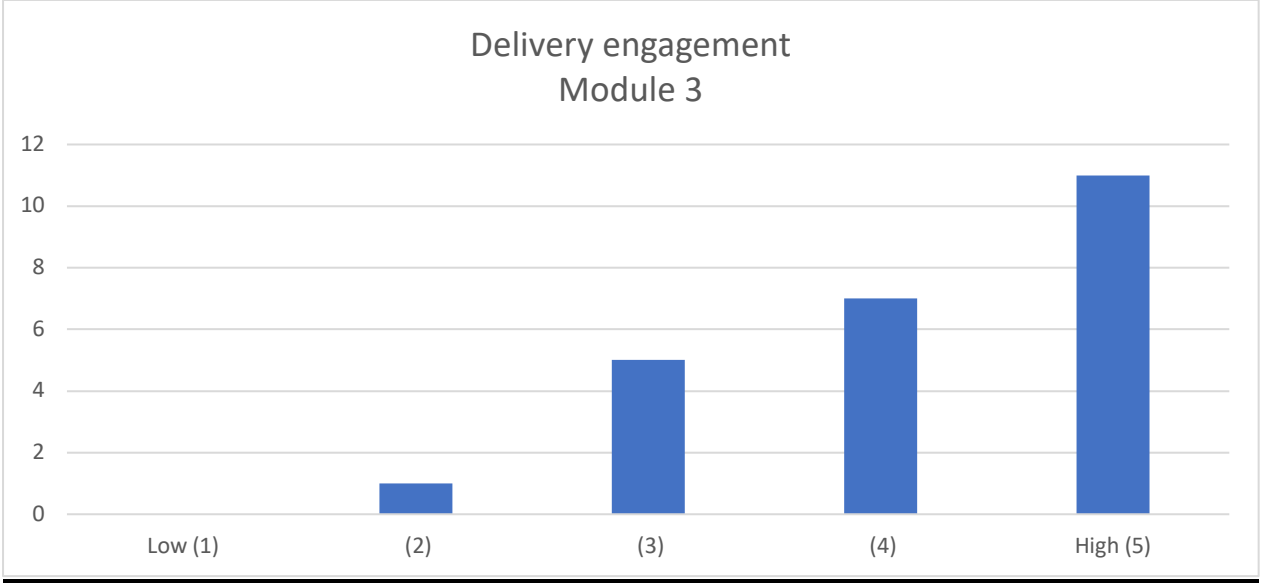
Table 9: Likert scale of Count of delivery engagement module three



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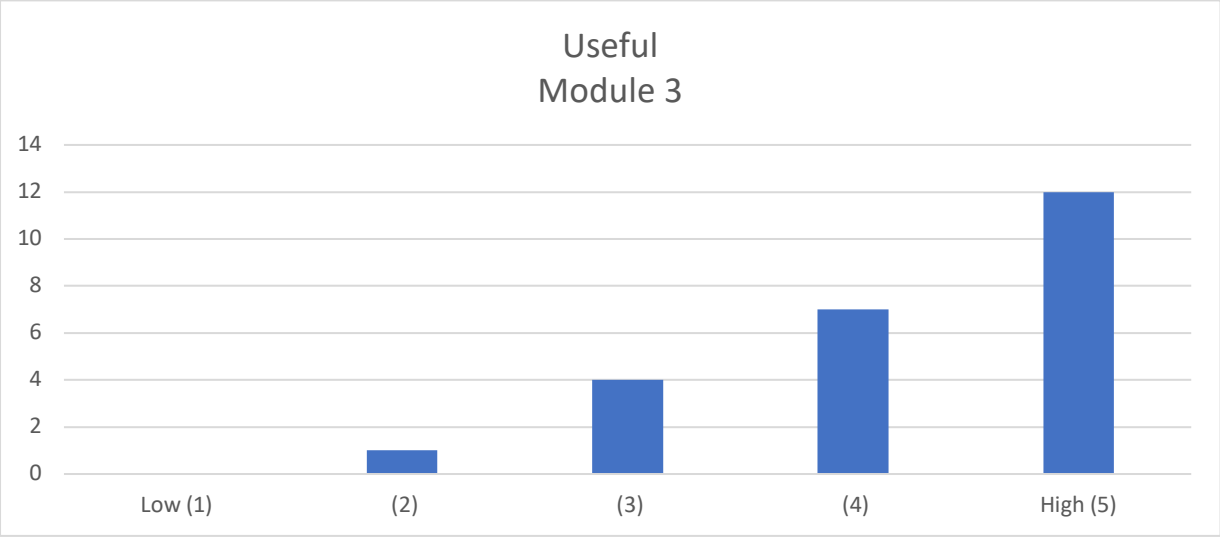

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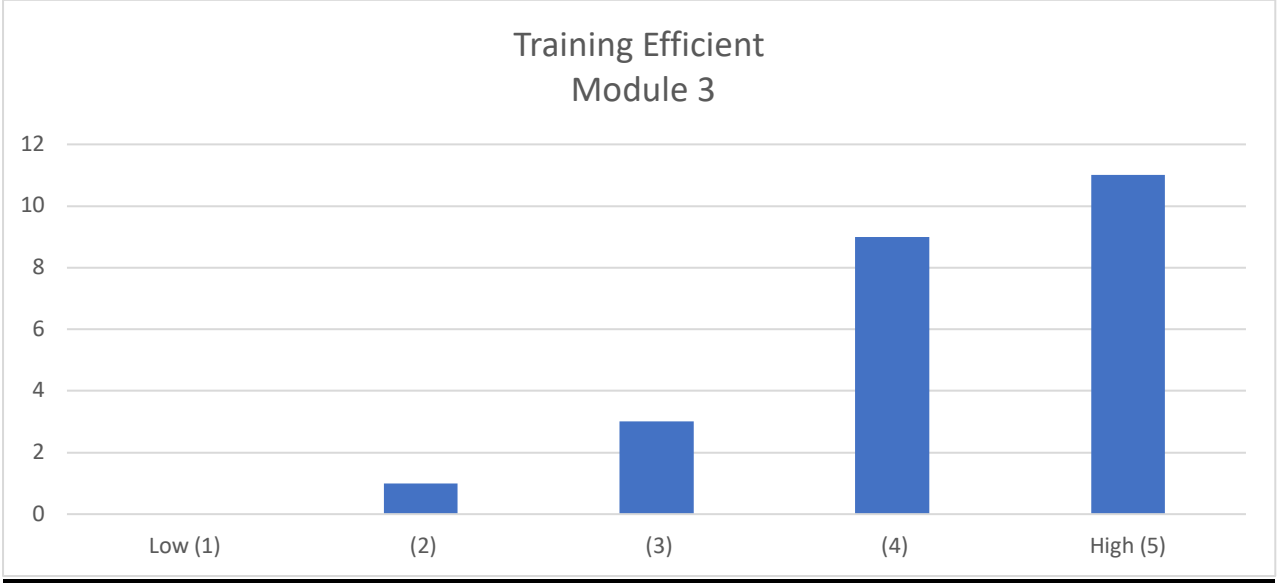

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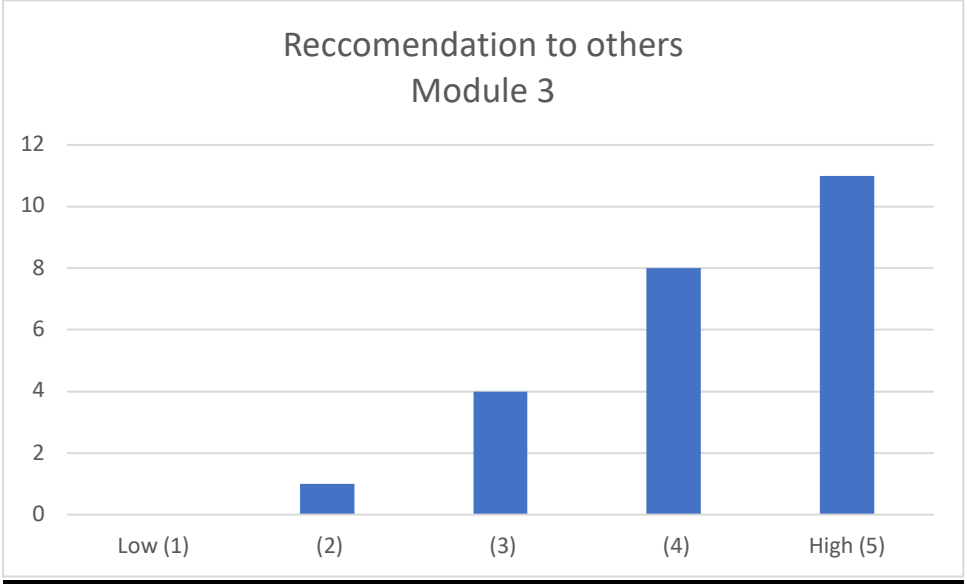

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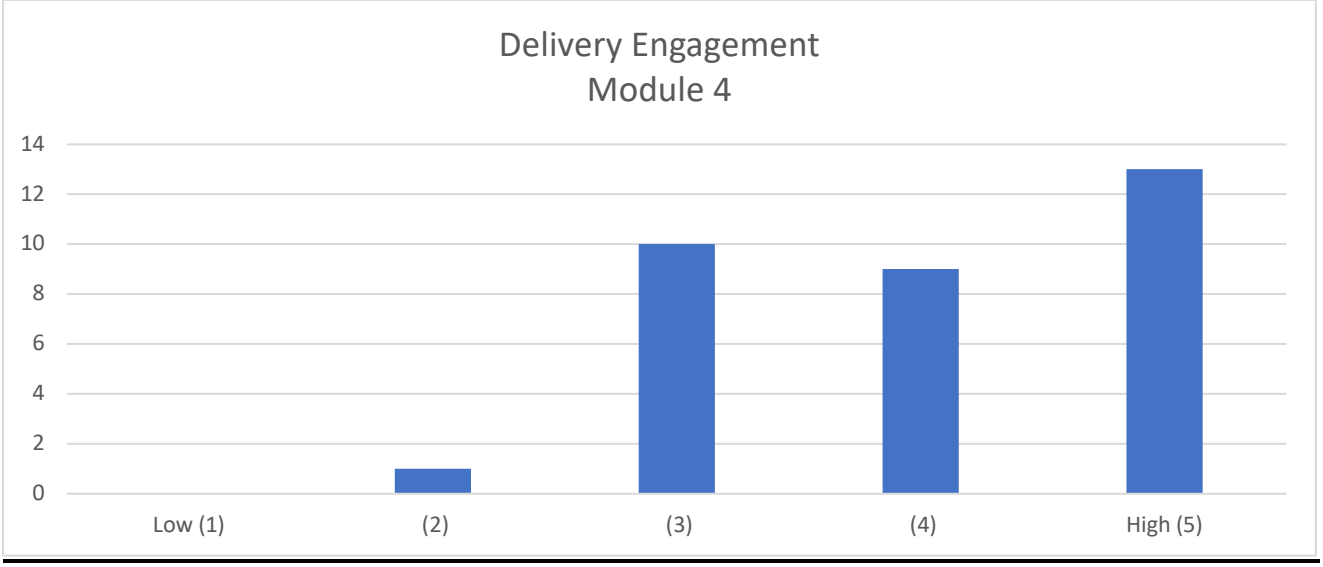

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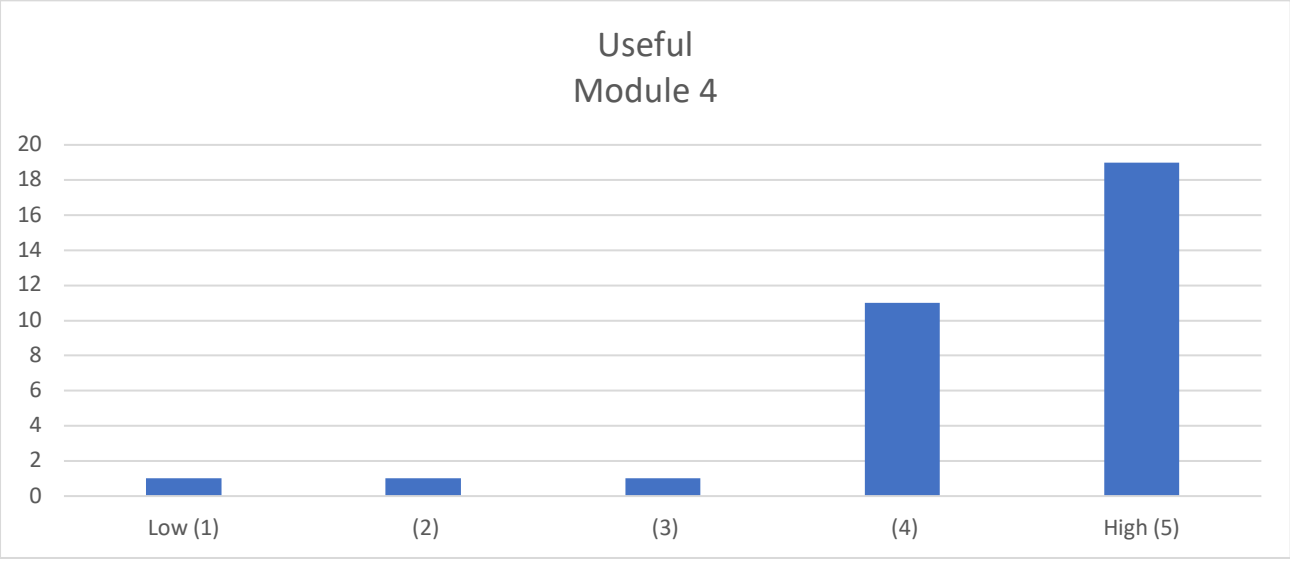

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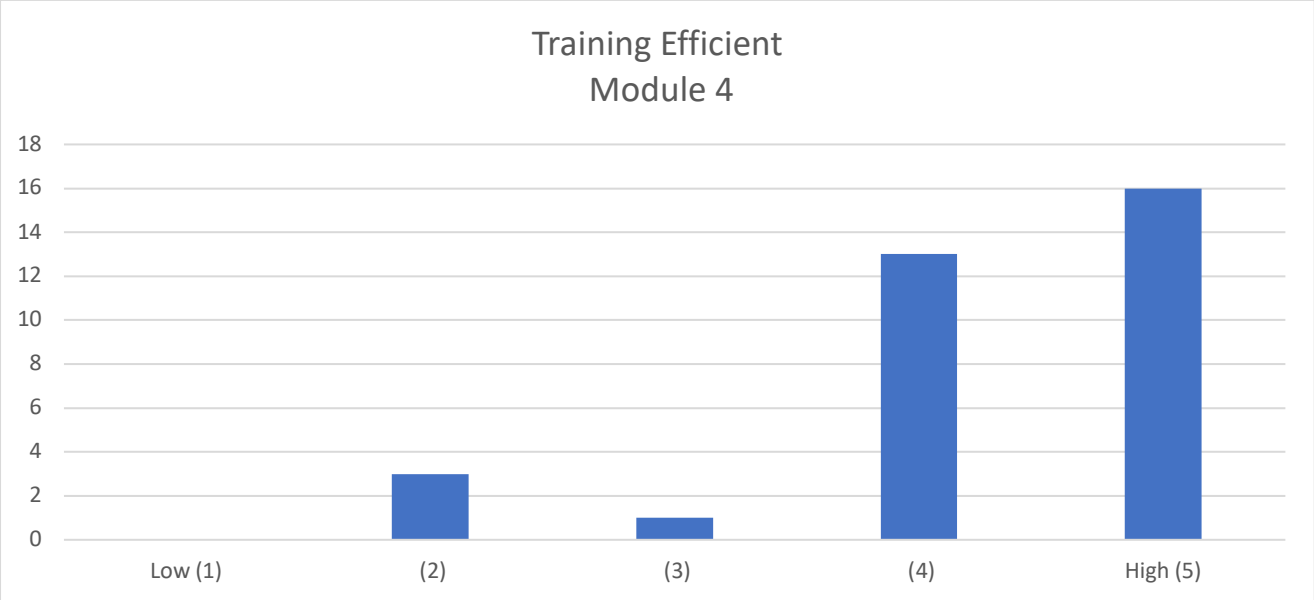

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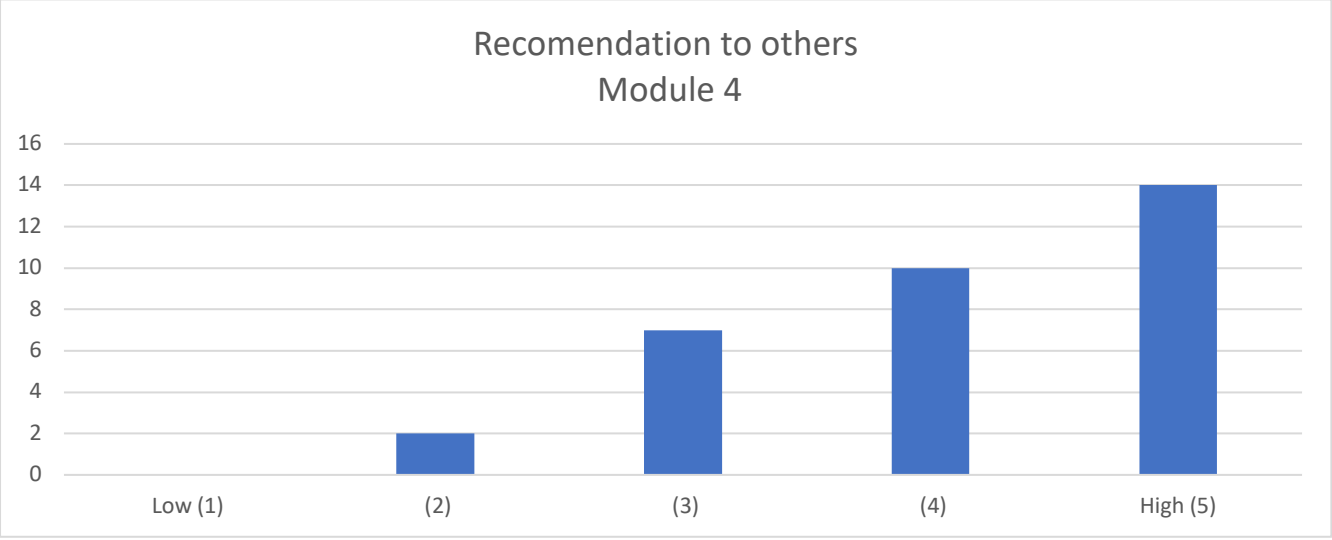

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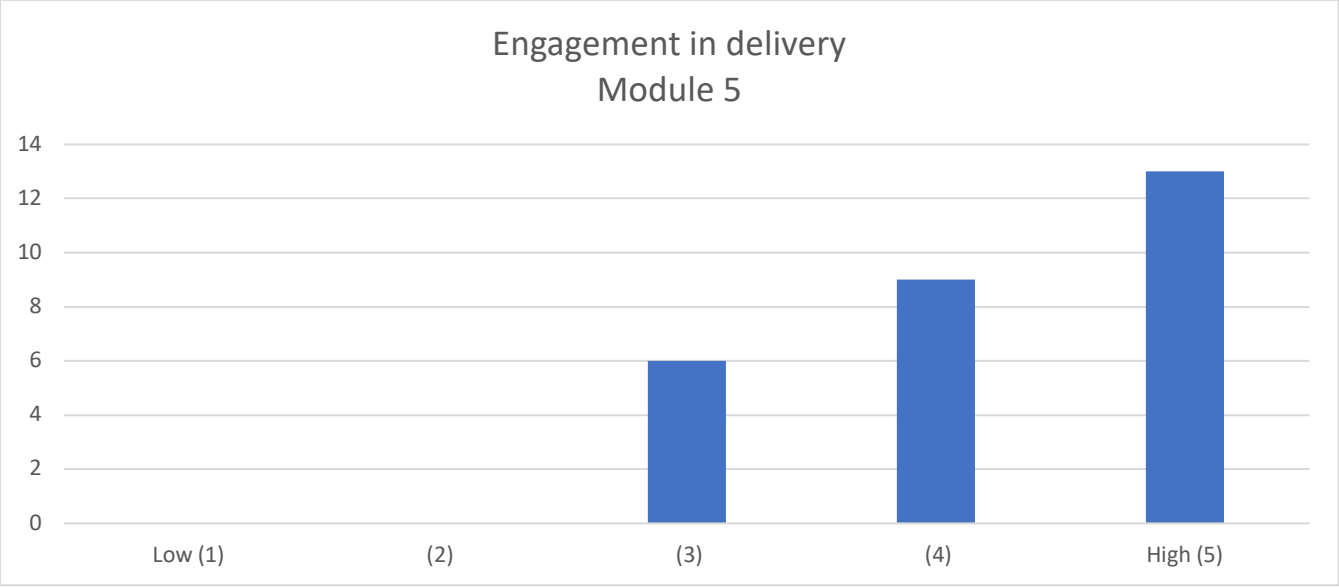

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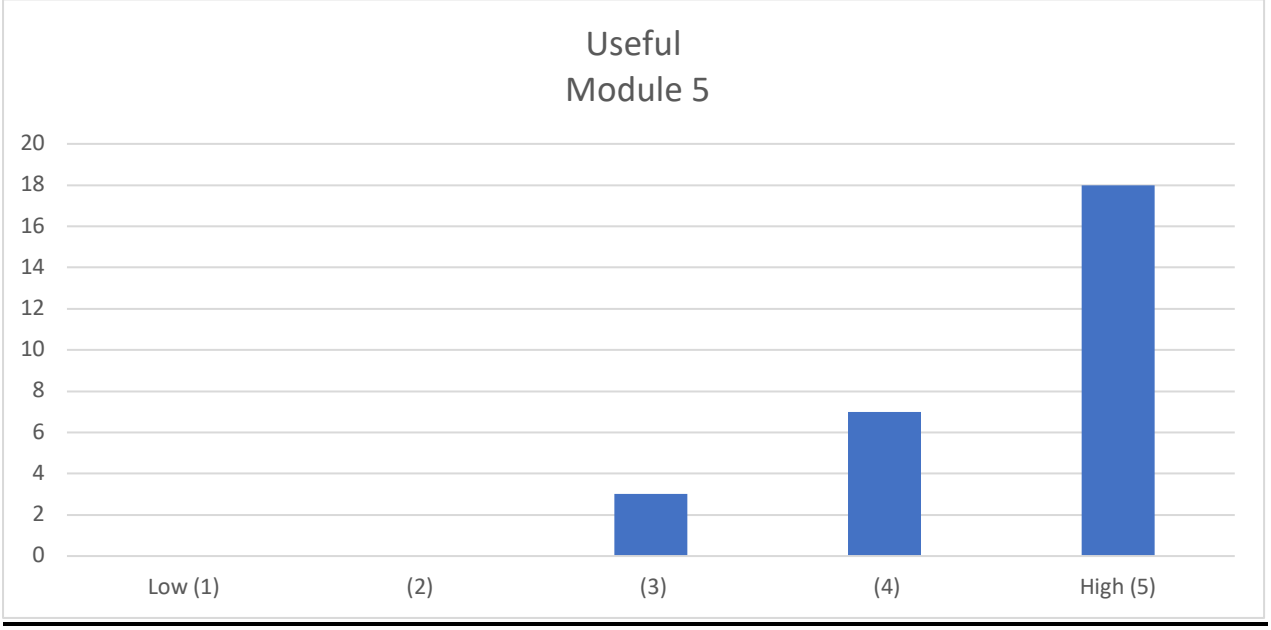

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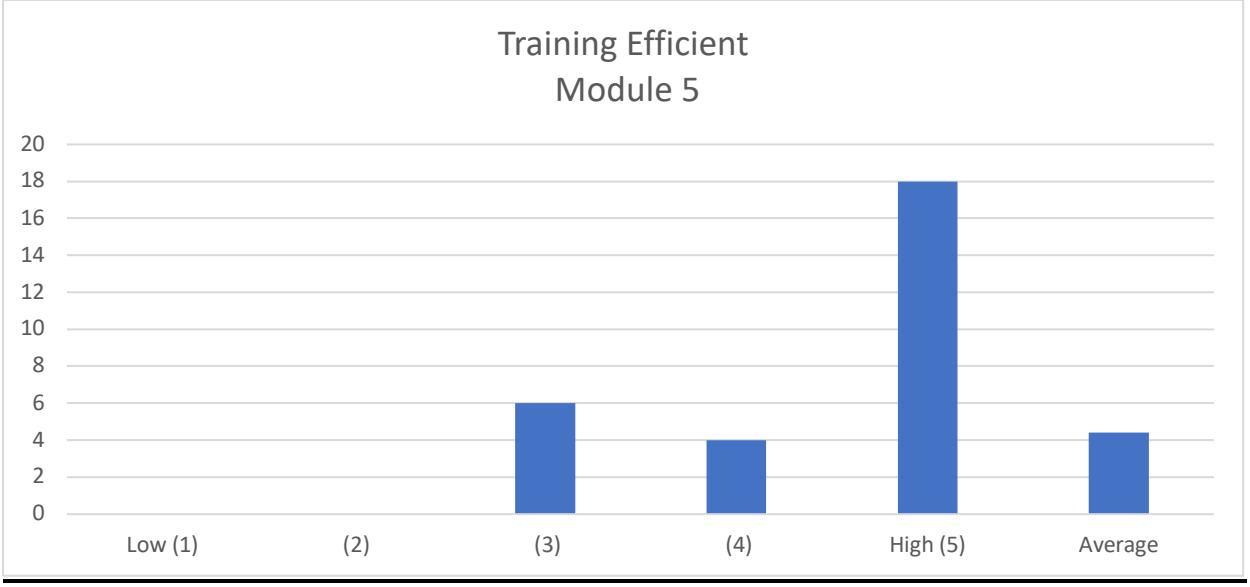

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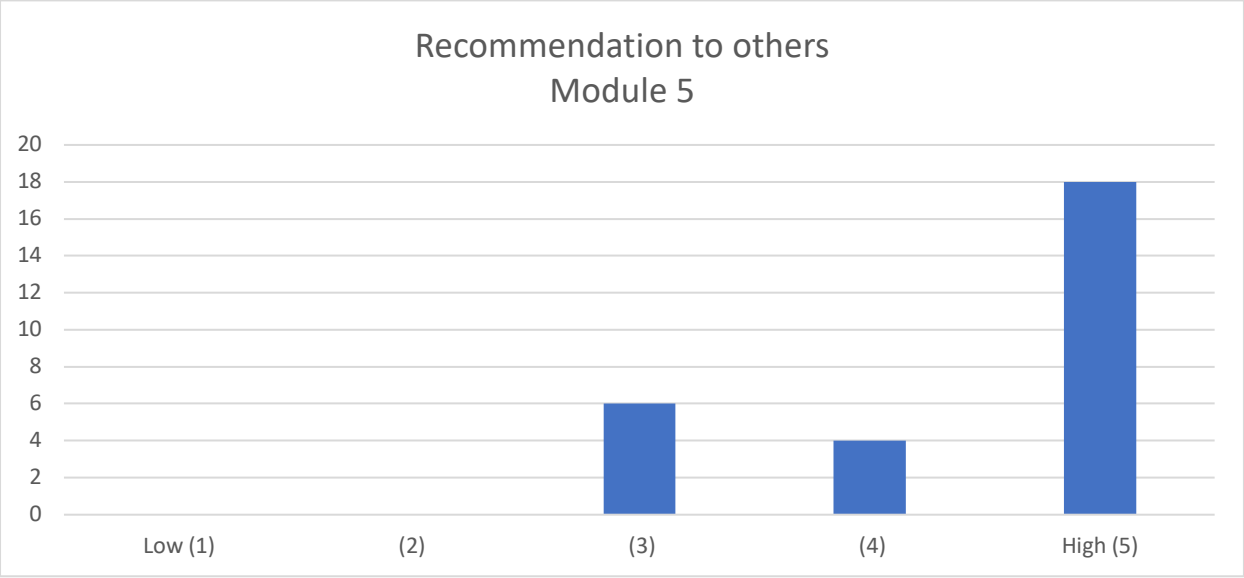

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