

Uncovering the facilitating influence of shared technology use on working alliance in Type-2 diabetes management with Indigenous Australian patients and healthcare providers

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Abstract

Addressing the prevalence of chronic diseases among Indigenous populations remains a critical global challenge. The ongoing COVID-19 pandemic has accelerated the adoption of digital health technologies (DHTs) among Indigenous patients and their healthcare providers, enabling remote chronic care delivery. To ensure culturally safe and patient-centred care through these digital channels, it is imperative that the use of DHTs fosters a collaborative patient-provider relationship. This research-in-progress paper incorporates the indigenous perspectives and draws upon the concepts of the working alliance from psychology and the information systems affordance theory to explore how the shared use of technology facilitates a collaborative patient-provider relationship (i.e., working alliance) in the context of managing type-2 diabetes among Indigenous Australian patients.

Keywords: Indigenous Australians, Technology Use, Diabetes Management, Working Alliance, Affordance Theory.

1. Introduction

The global indigenous population, encompassing the First Nations people of Australia, Canada, New Zealand, and the United States, confronts a multitude of challenges that significantly impact their health and well-being. Of particular concern are the disparities in the prevalence and management of chronic conditions within these communities, perpetuated by a complex web of socioeconomic, cultural, and historical factors (Marrone, 2007). For instance, in Australia, there is an alarming 80% mortality gap between Aboriginal and Torres Strait Islander people (hereafter referred to as Indigenous Australians) and non-indigenous Australians due to chronic disease (Australian Institute of Health and Welfare, 2011). Effective chronic disease management within an Indigenous context

requires a culturally sensitive, collaborative and patient-centred approach that empowers Indigenous patients to actively participate in shaping their own care plans (Curtis et al., 2019; Nguyen, 2008; Wilson et al., 2020). The collaborative and patient-centred approach is also a prominent movement in medicine, and researchers highlight the significance of the patient-provider relationship in enabling patient activation and engagement within this patient-centred approach (Håkansson Eklund et al., 2019; John et al., 2020; Scholl et al., 2014).

Digital health technologies (DHTs) are instrumental in empowering patients to actively participate in their own healthcare (Grando et al., 2015). DHTs also facilitate healthcare providers in delivering ongoing care and self-management support to their patients (Greenwood et al., 2022). The use of DHTs by Indigenous communities and their healthcare providers has accelerated in recent years, especially in response to the COVID-19 pandemic, leading to significant advancement in the continuity and ongoing delivery of care for Indigenous chronic disease patients (Choukou et al., 2021). To ensure the effectiveness of DHT in enabling both Indigenous patients and providers, it is crucial for their use to facilitate and support a collaborative patient-provider relationship (Hiratsuka et al., 2013; Mooi et al., 2012; Wannheden et al., 2022).

The working alliance, derived from the psychology literature (Bordin, 1979; Hougaard, 1994), is a widely adopted holistic conceptualisation of the patient-provider relationship. It has been shown to be a reliable predictor of treatment outcomes (Fuertes et al., 2017). According to the working alliance model (Bordin, 1979), a collaborative patient-provider relationship, characterised as a working alliance, is contingent upon three key elements: 1) mutual agreement on goals, 2) mutual agreement on tasks, and 3) the establishment of an attachment bond that

encompasses trust, affinity, and rapport between the patient and provider.

Currently, the existing frameworks adopted to study collaborative DHT use fail to encompass the nuances and dynamics inherent in the patient-provider relationship. Previous reviews have also highlighted that existing literature on technology-enabled patient-provider collaboration for chronic disease management lacks theoretical depth and richness (Jiang & Cameron, 2020; Wannheden et al., 2022). Furthermore, the present state of information systems (IS) research and IS theories on DHT use falls short in incorporating the indigenous perspective. Consequently, there are growing calls for the development of new IS theories to draw from the indigenous cultural elements from specific global contexts (such as Davison, 2021).

The patient-provider relationship holds significant importance in the delivery of medical services. As these interactions increasingly adopt digital channels, it is crucial to gain a comprehensive understanding of how the use of DHTs can contribute to the development of an effective patient-provider relationship. This understanding is particularly significant for delivering culturally safe (Canuto et al., 2021) and competent care (Liaw et al., 2011) to indigenous patients.

Given this background and the growing demand for contextual IS theorising regarding the use of DHTs in healthcare (Burton-Jones & Volkoff, 2017), combined with the urgent calls for enhancing diabetes care for Indigenous people (Harris et al., 2017), our ongoing research-in-progress study draws upon the combined conceptual lens of working alliance from the psychology literature (Bordin, 1979; Hougaard, 1994) and leverage the IS Affordance theory (Gibson, 1977; Pozzi et al., 2014). By leveraging this combined lens, our study aims to explore the collaborative use of DHTs and their features to answer the following research question: *How does the shared use of DHTs facilitate a working alliance between Indigenous Australian patients and their healthcare providers in the context of type-2 diabetes management?*

2. Background

2.2 Chronic Care for Indigenous Patients

The arrival of Europeans in 1788 marked a significant turning point in the lives of Indigenous Australians (Altman, 2003). Over time, there have been gradual shifts in physical activity, nutrition, and

lifestyle, which have contributed to the increasing prevalence of chronic diseases, including diabetes, amongst Indigenous Australians, particularly in the latter half of the 20th century (Burrow & Ride, 2016).

Diabetes is the second most prevalent chronic disease amongst indigenous Australians (Australian Institute of Health and Welfare, 2011). To effectively manage chronic diseases, such as diabetes, with a particular focus on Indigenous populations, several key considerations must be taken into account. Drawing upon a comprehensive literature review, Liaw et al. (2011) emphasise the critical success factors of engagement, improved communication, cultural competence, and shared responsibility through effective data and information management. It is imperative for programs to establish a supportive environment by fostering collaborative relationships ensuring cultural appropriateness, acceptability, and the effectiveness of diabetes self-management (Canuto et al., 2021). Indigenous care necessitates a patient-centred (Nguyen, 2008), holistic and collaborative approach aligned with the biopsychosocial model of treatment that recognises the significance of addressing not only the biological aspects of the disease but also the psychosocial aspects encompassing the patient-provider relationship (Engel, 1977; Wilson et al., 2020). Diabetes is also a complex and evolving chronic disease to self-manage, and research suggests that the majority of self-management problems are reported among diabetes patients (Hessler et al., 2019). This further reinforces the need for ongoing self-management support from healthcare providers and understanding how DHT can shape such collaborations in diabetes management.

2.3 Patient-Provider relationship

The patient-provider relationship has historically been a prominent focus within psychology literature, primarily due to its significant role in therapy. However, as medicine has shifted towards a more patient-centred and biopsychosocial approach to care (Engel, 1977), this has led to recognition the value of incorporating the patient's perspective in decision-making (Laine, 1996; Scholl et al., 2014), shared decision making (Charles et al., 1997; Håkansson Eklund et al., 2019) and patient-provider working alliance (Fuertes et al., 2007; Fuertes et al., 2017). Patient-provider working alliance has been recognised as one of the five key dimensions of patient-centred medical care (Mead & Bower, 2000).

From a socio-technical perspective, it is evident that technology has the potential to significantly transform the ongoing patient-provider interactions that may lead to the development of a working alliance. Given the critical role of the patient-provider working alliance in patient-centred medical care delivery, its consideration becomes an important factor in IS research on the shared use of DHT by patients and providers.

Consequently, the patient-provider dyad has received attention from IS researchers. For instance, Dadgar and Joshi (2018) emphasised the significance of accessibility, autonomy, dignity, empathy, feedback, trust, and sensemaking as essential values for patient-provider interaction and communication in the context of DHTs for diabetes management. In an interdisciplinary review conducted by Jiang and Cameron (2020), they discovered that automated data sharing had the potential to enhance patient-provider collaboration in chronic disease management. However, they also identified functional barriers and mistrust in the system as potential hindrances to effective collaboration. Moreover, they emphasised the need for more theoretically grounded research on patient-provider collaborative management of chronic diseases. Empirical IS research on the patient-provider relationship within the broader context of chronic disease management has been largely quantitative and focused on online health communities. These studies have evaluated the effects of online interpersonal and informational fairness (Zhang et al., 2018) and patient and doctor participation (Liu et al., 2020) on the patient-doctor relationship using indirect measures such as gift-giving behaviour.

Nonetheless, we contend that a comprehensive understanding of the intricacies of the patient-provider relationship in the context of technology-enabled chronic disease management is imperative, especially within the Indigenous context. This requires a qualitative exploration of the phenomenon to capture its nuanced aspects and gain a deep socio-cultural contextual understanding. Given the increasing adoption and use of DHTs by Indigenous Australians during and post-COVID-19 pandemic, understanding how DHTs can mediate and support a collaborative patient-provider relationship (i.e., working alliance) is critical for delivering culturally appropriate and patient-centred care to Indigenous Australian patients.

2.4 DHT use amongst Indigenous Patients

Amongst the different DHTs, telehealth is the most widely utilised tool among indigenous patients

(Caffery et al., 2017; Choukou et al., 2021; Fraser et al., 2017). Choukou et al. (2021) identified various types of telehealth applications, including teleconsultations, health screening, medical data processing and storage, and telehealth promotion. Their review highlighted that older Indigenous individuals with chronic diseases seek telehealth to improve access to healthcare, enhance health equity, and reduce costs. Caffery et al. (2017) conducted a systematic review, revealing that telehealth improves social and emotional well-being, clinical outcomes, and access to health services for Indigenous patients while reducing travel and increasing screening rates. Importantly, Fraser et al. (2017) found that telehealth interventions are effective from a clinical perspective, with Indigenous individuals expressing satisfaction but also concerns about cultural safety.

Building relationships between Indigenous patients and healthcare providers is crucial for health outcomes, cultural appropriateness, and successful telehealth implementation. However, few studies have specifically examined the patient-healthcare provider relationship in the context of DHT use among the Indigenous population. An examination of the perceptions of Native Hawaiian and Alaska Native patients and their healthcare providers regarding telehealth's potential in managing chronic diseases revealed that remote interactions could complement the establishment of a patient-provider relationship. However, the study primarily focused on broader aspects of developing an effective patient-provider relationship rather than specifically exploring how the system use practices impacted that relationship (Hiratsuka et al., 2013). Similarly, in the context of teleoncology, Mooi et al. (2012) discovered that healthcare providers viewed telehealth as a beneficial tool for supporting working relationships and facilitating collaborative care. However, the study did not delve into the intricacies of technology use that contributed to improved working relationships. Both studies concluded that initial face-to-face interactions are recommended for relationship development (Hiratsuka et al., 2013; Mooi et al., 2012).

3. Conceptual Framework

This study aims to understand how the shared use of DHTs facilitates a working alliance between Indigenous Australian patients and their healthcare providers in type-2 diabetes. The conceptual framework for this research adopts a socio-technical perspective (Lee, 2001), integrating theories and models to comprehensively understand the social and technical aspects of this phenomenon.

Firstly, to conceptualise the patient-provider relationship and its collaborative formation, we adopt the working alliance concept from psychology literature. Working alliance refers to the quality of a helping relationship between a change seeker (patient) and a change agent (healthcare provider). Based on Bordin's (1979) Working Alliance Model, the three components of a working alliance are 1) Agreement on goals, 2) Agreement on tasks, and 3) Attachment bond depicted by trust, liking and rapport. According to Hougaard's (1994) bi-partite view of a working alliance, both patients and providers contribute to its formation. He conceptualised working alliance to have two dimensions: the collaborative relationship and the personal relationship. The agreement on goals and tasks is considered a part of the collaborative relationship dimension, while the attachment bond is a part of the personal relationship dimension. Based on his view, for the use of DHT by Indigenous patients and providers to support working alliance, there are several factors that need to be influenced. For instance, patients' use of DHT should enable them to enhance their confidence, compliance, and receptiveness to health interventions, while providers' use of DHT should enable their authenticity, acceptance, and understanding of the patient's condition. These contribute to their personal relationship involving attachment bond in working alliance. For fostering the collaborative relationship involving agreement on goals and tasks in working alliance, the patient's use of DHT must enable them to enhance their working capacity, motivation, and positive expectations from the health intervention. At the same time, the healthcare provider's use of DHT must enable their expertise and engagement in care providing. The collaborative and personal relationships in working alliance are interdependent. For instance, a personal relationship involving attachment bond may persuade collaboration, and ongoing collaboration may improve the personal relationship. It is important to consider the enablement of the individual contributing factors from both the patient and provider perspectives regarding their use of DHT and the mediating role of DHT in supporting their working alliance. Equally important is the patients' perception of their healthcare providers' use of DHT and vice versa. By taking into account these subjective and intersubjective viewpoints, a more holistic understanding of technology-enabled working alliances can be achieved. This conceptualisation is depicted in Figure 1.

In addition to the working alliance lens, this research adopts the Affordance theory (Gibson, 1977),

commonly used in IS studies to understand the context of system use (Burton-Jones & Gallivan, 2007; Burton-Jones & Volkoff, 2017; Pozzi et al., 2014). According to affordance theory, the features of a technological artifact offer potential affordances for both patients and providers. However, it is important to note that these affordances must be actualised through use to influence patient and provider factors related to working alliance and chronic disease management. By adopting this combined conceptual lens, we can examine how the use of DHT features and the affordances derived from this use influence the working alliance between patients and providers and their diabetes management. It also enables exploration of the use experiences of both patients and providers as individual goal-driven users and their individual contribution to working alliance. While these concepts serve as a starting point for understanding technology-enabled working alliance, the research conceptual framework will evolve as data is collected and analysed.

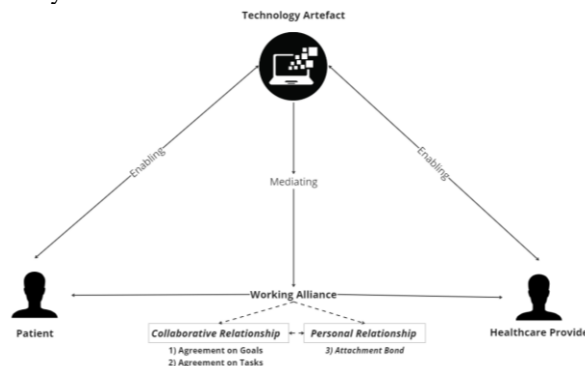


Figure 1. Conceptual Framework for understanding technology-mediated working alliance between patients and healthcare providers.

4. Methodology

This research is interpretive, exploratory and qualitative (Klein & Myers, 1999). We consider that technology-enabled working alliance in collaborative diabetes management is formed through the subjective experiences of Indigenous patients and healthcare providers, as well as their shared construction of working alliance. By employing an interpretive and qualitative approach, our objective is to gain an in-depth understanding of this socio-technical phenomenon by examining the meanings and perceptions attributed to the experiences of Indigenous patients and their providers (Klein and Myers, 1999).

This study employs a combined approach of a single case study (Benbasat et al., 1987) and a

constructivist grounded theory methodology (Charmaz, 2006). The use of a single case study allows for a detailed exploration of technology-enabled working alliance, providing rich and in-depth insights (Walsham, 1995). By adopting constructivist grounded theory, this research embraces a collaborative and co-creative process of knowledge and theory development between the researcher and the participants (Charmaz, 2011; Chun Tie et al., 2019), in line with Indigenous research methodologies (Bainbridge et al., 2013). Moreover, the combination of case study and grounded theory methodologies is well-suited for IS research (Halaweh, 2008; Hughes & Jones, 2003).

4.1 Selection of Case

The case selected for this research is the Virtual Health Services (VHS) system from Telstra Health and Goondir Health Services. Goondir Health Services is an Aboriginal Community Controlled Health Service (ACCHS) that provides primary healthcare and related health services to the local Aboriginal and Torres Strait Islander (ATSI) communities from Oakey in the Southeast of Queensland, Australia, to St George in the Southwest of Queensland, Australia. The VHS system was developed in partnership between Telstra Health and Goondir Health Services to help support patients and healthcare providers by improving communication and remote monitoring between patients and healthcare providers in remote regions, particularly during the COVID-19 pandemic. The VHS system offers a secure digital platform for healthcare providers to track their patient's health remotely by connecting to a mobile app through a compatible device. The platform generally monitors various vital signs such as pulse rate, oxygen level, temperature, blood sugar, weight, and blood pressure. Once the patient's health data is transmitted securely, the system automatically alerts the clinician if there are any concerning changes, allowing healthcare providers to promptly connect with the patient via a secure video call on their compatible mobile device (Telstra Health, 2021). There are several technological components that are a part of this system; these include: Samsung tablet, BP monitor, Weight Scale, Pulse oximeter, blood glucometer, MyCareManager, which is the VHS software and Communicare which is a Patient Information Recall System (PIRS). Goondir has enrolled 198 Indigenous patients in the VHS system since 2020, providing them with remote care through the platform. The University of Queensland recently evaluated the system for its clinical effectiveness, cost-effectiveness, organisational impact, and patient satisfaction, with

initial results showing positive outcomes (Smith et al., 2021). Patients found the VHS system easy to use, and it has effectively improved their engagement and empowerment, increasing their interactions with healthcare providers. These promising results, along with the large number of users who have used the system for an extended period, make the VHS system a valuable case study for exploring how technology can enhance collaborative diabetes management between Indigenous Australian type-2 diabetic patients and their healthcare providers.

4.2 Data Collection

The data collection process for this study will be conducted in two stages. The first stage, which focused on scoping the research, has already been completed. The second stage aims to collect primary data to address the research question.

To recruit participants for data collection in both stages, an initial purposive sampling approach will be employed (Patton, 2015). In the first stage, a focus group (Morgan, 1996) was conducted as the data collection method. Representative participants from the key stakeholder groups were recruited as participants of this focus group, which included a total of six participants: a Goondir senior management member, a Goondir executive of strategy and planning, a VHS manager, and three users of the VHS system, a patient, a clinician and a health coach. These participants were recruited to gain a comprehensive understanding of the research context. The focus group session took place via Zoom in early June 2023 and lasted one hour and forty-five minutes.

For the primary data collection in the second stage, the goal is to recruit ten patients and ten healthcare providers, comprising clinicians and health coaches. The inclusion criteria require a minimum usage of the VHS system for six months, as previous research suggests that this timeframe allows for the exploration and adoption of optimal technology use to meet individual and collaborative needs (Gammon et al., 2017). In-depth semi-structured interviews will be conducted to collect the primary data (Charmaz & Belgrave, 2012). The actual number of interviews will depend on reaching theoretical saturation, with research suggesting that conducting 9 to 17 interviews is typically sufficient (Hennink & Kaiser, 2022). The interview protocols have been developed based on the sensitising concepts related to the patient-provider working alliance, derived from the research conceptual framework and the findings from the first stage focus group. The anticipated duration for each

interview is approximately 45 minutes to an hour, and the interviews are scheduled to be completed during October-December 2023. In addition to the primary data, secondary data such as system logs, user guides, media releases, and company reports will also be collected to support data triangulation and corroborate the findings.

4.3 Data Analysis

This study employs a constructivist grounded theory approach (Charmaz, 2006) for data collection and analysis, utilising a concurrent and iterative process. The initial data will undergo line-by-line coding during the initial coding phase. The constant comparative analysis, a distinctive feature of grounded theory methodology, will be employed to compare codes and categories, revealing similarities and differences and facilitating the refinement of categories. This analysis guides the theoretical sampling process, which involves identifying and gathering additional information to fill gaps in the data. The data collected through theoretical sampling will then be focus-coded, with frequently used codes organised into categories. In the final stage of theoretical sampling, connections will be established between codes and categories to develop a theoretical framework and construct a cohesive narrative, presenting a grounded theory of technology-enabled working alliance between Indigenous Australian patients and providers in collaborative diabetes management.

The data analysis for the initial focus group session has been concluded as part of our research process. The primary objective of this focus group was to establish the scope of our study, gain a comprehensive understanding of the Goondir VHS system within its contextual setting, and inform the development of interview protocols for the subsequent data collection phase to address the research question. During the focus group session, several key themes and insights emerged. Some of these included the importance of adopting a holistic virtual care model that encompasses the medical, emotional, and social dimensions of patient care. Additionally, the quality of patient-provider interaction was highlighted as a crucial factor, emphasising the significance of meaningful engagement rather than simply increasing or decreasing the quantity of interaction. Trust and cultural safety were identified as essential elements. It was also highlighted that the use of the VHS system had experienced changes from when it was implemented during the Covid-19 pandemic and to the present post-pandemic period. The significance of

health coaches was underscored as a pivotal factor in fostering and sustaining patient engagement within the evolving digital landscape of chronic care at Goondir. Furthermore, community connection and the significance of maintaining a non-judgmental and respectful attitude towards patients were highlighted as important considerations. The key points from the focus group session confirm the need for indigenous contextual theorising of patient-provider working alliance and provide valuable insights that will inform our research and guide the subsequent stages of data collection through interviews with patients and providers and the associated analysis. Based on the findings of the focus group session and the ongoing secondary data analysis, we are advancing our conceptual framework and interview protocol to begin primary data collection.

5. Expected Contributions

This study is anticipated to have both theoretical and practical implications, which are examined considering the generalizability of the findings and theory generated. We acknowledge that the scope of generalizability will be constrained by the specific contextual factors in which the theory was developed (Seddon & Scheepers, 2015).

Firstly, this research aims to produce rich insights (Walsham, 1995) into the experiences of Indigenous Australian patients and their healthcare providers using DHT for collaborative diabetes management. Additionally, the research aims to develop a theoretical explanation with an in-depth understanding of technology-mediated working alliance and develop a type II theory for explaining (Gregor, 2006) how the collaborative use of DHT and its features facilitate a working alliance between type 2 diabetic Indigenous Australian patients and their healthcare providers. Moreover, through the integration of the working alliance model from psychology literature and IS affordance theory, this research will introduce a novel theoretical framework that offers IS researchers a new perspective to comprehend the patient-provider relationship and working alliance facilitated by technology use.

In addition to its theoretical contributions, this research endeavours to offer practical insights and recommendations to Goondir for enhancing their VHS system, with the aim of fostering working alliance and collaboration between Indigenous patients and healthcare providers in diabetes management. The findings of this study will not only inform Goondir's system improvements but also provide valuable

guidance for the policy development, design, and implementation of similar Aboriginal Medical Services (AMS) that cater to the needs of Indigenous Australian patients and healthcare providers in diabetes management. Moreover, the research outcomes will have implications for the training and professional practice of healthcare providers utilising DHT within AMS, empowering them to effectively cultivate working alliances with their Indigenous patients. By addressing these practical aspects, this research aims to make a meaningful impact on the delivery of healthcare services and contribute to the overall well-being of Indigenous communities.

6. Limitations

While this study strives to provide valuable insights and contributions, it is essential to acknowledge its limitations. Firstly, the research is context-specific, focusing on Indigenous Australian patients and healthcare providers in diabetes management within the Goondir organisation. Consequently, caution must be exercised in generalising the findings to other settings and diverse Indigenous populations. Secondly, the study's reliance solely on qualitative methods may hinder the ability to quantitatively measure certain aspects of technology-enabled working alliance, which could provide a more objective assessment. Additionally, the study exclusively includes type-2 diabetic patients, and although there are similarities between type-1 and type-2 diabetes management, differences exist that may influence how the use of DHT facilitates working alliance. Lastly, an important limitation of this study is the exclusion of technology vendors (i.e. Telstra Health) associated with the VHS system, which may impact our comprehensive understanding of the technology and its potential implications. Despite these limitations, this study serves as a valuable foundation for comprehending the impact of DHT use on working alliance in diabetes management among Indigenous Australian patients and healthcare providers.

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