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The Effect of Technology Readiness on Individual Absorptive Capacity Toward Learning Behavior in Australian Universities

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ABSTRACT

Recipient's absorptive capacity (ACAP) is a barrier to knowledge transfer in organizations. The technology readiness (TR) dimensions measure an individual's technological beliefs and aligns with the individual's ACAP. The purpose of this research is to study if technological beliefs have a causal effect onto individual learning capability and behaviour. University's knowledge transfer makes them an ideal context for this research. Through surveying individuals and conducting statistical analysis, the authors provide empirical evidence that there is a causal effect from the TR dimensions to individuals ACAP and their technological learning behaviour at the individual level. The findings could potentially help leverage technology to address said recipient's ACAP. It would also benefit the development of new technologies, in particular in e-learning and tailoring pedagogy.

KEYWORDS

Individual Absorptive Capacity, Knowledge, Pedagogy, Technology, Technology Readiness

INTRODUCTION

For organizations to succeed, knowledge is critical (Garavelli, Gorgoglione & Scozzi 2002; Goh 2002; Karlsen & Gottschalk 2004). However, knowledge transfer can have barriers even if an organization is fully dedicated to managing its knowledge (Szulanski 1996). These barriers include causal ambiguity, arduous rapport between knowledge holder and recipient, or recipient's Absorptive CAPacity (ACAP) (Szulanski 1996). The first two appear to be resolved with horizontal organizational structures (Karlsen & Gottschalk 2004; Tang, Xi & Ma 2006; Uygur 2013). But the third, the recipient's ACAP, stubbornly remains obstructive (Szulanski 1996). ACAP is often construed an dynamic organizational capability

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to acquire, assimilate, transform and exploit knowledge (Zahra & George 2002). Having said that, from an individual perspective, it remains less researched and understood (Dolmark, Sohaib & Beydoun 2019; Dolmark et al. 2021; Lowik, Kraaijenbrink & Groen 2017; Minbaeva, Mäkelä & Rabbiosi 2012). As individuals are part of organisations (Cohen & Levinthal 1990, p. 131), organisation's knowledge transfer stems from individuals behaviour (Minbaeva, Mäkelä & Rabbiosi 2012). Understanding how individuals absorb knowledge can help understand the transfer of knowledge within organisations.

In the educational context, technology as an enabler (Lin, Chang & Chang 2004)impacts students beyond their education (Raskind & Scott 1993). The Technology Readiness (TR) dimensions measure individuals' belief in technology (Lin, Shih & Sher 2007), aligning well with individual ACAP. As behaviour is influenced by beliefs (Ajzen 1991), an individual's belief in technology can be expected to affect their learning behaviours and measured by the Individual Work Performance (IWP) (Koopmans et al. 2013). Universities are an ideal context to examine knowledge transfer and learning behaviour since they pursue the goals of knowledge transfer to individuals. In fact, improving the effectiveness of e-learning and e-learning systems is an essential issue for education and information systems (Ozkan, Koseler & Baykal 2009). When the context of experimentation is conducted in the classroom settings, research yields results that are easier to implement for teachers (Rosenberg & Koehler 2018). Students also benefit from the set of technologies they have learned to use during their education (Raskind & Scott 1993).

As there is already little research into ACAP at the individual level, there is even greater absence of research into bridging technology and individual ACAP. This research aims to examine if there is a causal effect between technology readiness dimensions and individual ACAP towards their learning behaviour. Our research question is "what impacts an individual's technological belief has on their capability to absorb knowledge towards their learning behaviour". Extending the scope of knowledge using TR would be a valuable benefit rather than taking a shallow view into ACAP. This paper revisits the relation between ACAP at the individual level, technological beliefs, and behaviour to understand said relation better.

This research further addresses the gap between technology and learning at the individual level. The conceptual framework underpinning this research originated from peer-reviewed journal articles and so were their instruments. Partial Least Squares-Structural Equation Modelling (PLS-SEM) was the method used for the analysis and the SmartPLS v3 was the software used. The data used for the analysis was collected using a web survey (see Appendix for the items used in said survey). Using email and face-to-face advertising at University of Technology Sydney (UTS), 249 responses were recorded, and after filtering out incomplete or invalid responses, 199 data points were collected. Further explanations are provided in the theoretical background and methodology sections.

The main contributions of this study are listed here. It provides insights about the effect of technological beliefs onto individual learning which with the expansion of technology and e-learning, is important. Pedagogues, leaders, and IT professionals would benefit from the insights into which technological belief should be leveraged to improve an individual's learning. It offers a framework to assess the effect of beliefs onto individual learning. The TRI can be substituted with other conceptual frameworks about beliefs, or even this paper's whole framework could be readapted. It provides another use for PLS-SEM. While it is popular (Hair Jr., Sarstedt, et al. 2014) and used in social sciences (Hair, Risher & Ringle 2019; Hair Jr., Sarstedt, et al. 2014; Henseler et al. 2014; Lee et al. 2011; Peng & Lai 2012; Sosik, Kahai & Piovoso 2009), this paper shows that PLS-SEM has used in the area surrounding cognition and psychology.

The paper is organized as follows: Section 2 introduces knowledge, its transfer, its importance, and barriers to its transfer as a prelude to on individual ACAP. ACAP is explained in further detail with its framework and context. This is followed by a similar treatment of TR. Once the theoretical scene is set, section 3 presents the hypotheses with their development. Section 4 covers the data collection, the origin of the instrument, and the method used with its software. Section 5 presents and discusses the results. Finally, a conclusion with limitations and recommendations are presented.

THEORETICAL BACKGROUND

Data, information, and knowledge were defined by Davenport and Prusak (1998, p.2-6) respectively as when data has meaning, it is information, and when information has been experienced, it is knowledge (Garavelli, Gorgoglione & Scozzi 2002; Karlsen & Gottschalk 2004). There is not a clear understanding of the factors that contribute to making knowledge (Davenport & Prusak 1998, p.5), since in many cases, it is intangible and tacit (Lopez-Cruz & Garnica 2018). Knowledge transfer is a communication process (Vance & Eynon 1998), which is affected by the subjects' objectives, experiences, values, and context (Garavelli, Gorgoglione & Scozzi 2002). Knowledge is difficult to encode and formalize because it is personal, making it harder to transfer (Goh 2002; Polanyi 1967, p.4-5). Knowledge can only be of value if it can be accessed when needed and useless if accessed in hindsight (Kuo & Lee 2009). Experience does help develop knowledge (Davenport & Prusak 1998, p.7). However, tacit knowledge can be misinterpreted or disputed (Bhatt 2001). Being overwhelmed with information yields little value, as information that an individual reflects or learns has value (Kuo & Lee 2009). Understanding how an individual absorbs knowledge could provide insights to improve learning.

Knowledge is considered critical for organizations to succeed (Karlsen & Gottschalk 2004). Managers who do not leverage knowledge are jeopardizing their operations (Prusak 1997). Organizations that recognize the importance of knowledge spend a lot of resources to manage it (Iyengar, Sweeney & Montealegre 2015). They attempt to transfer knowledge where it can be used (Kuo & Lee 2009; Vance & Eynon 1998). Even if organizations fully commit to managing knowledge, barriers to its transfer can still exist (Szulanski 1996). Causal ambiguity, an arduous rapport between a knowledge holder and recipient, and recipient's ACAP are the most common barriers rather than an employee's motivation (Szulanski 1996). Causal ambiguity happens when the cause of an effect is uncertain or unknown. An arduous relation between the knowledge holder and recipient can more often stem from a punitive and distrustful organizational culture than a technological issue. It transpires as withholding critical information as a means to assert power by managers (Goh 2002). Horizontal structures appear to be an effective solution to causal ambiguity, and arduous rapport between knowledge holders and recipients (Tang, Xi & Ma 2006; Uygur 2013). Such structures encourage communication flow across business functions (Goh 2002) and allow subunits to share knowledge (Uygur 2013).

Understanding Absorptive Capacity

Cohen & Levinthal (1990) first introduced the concept of ACAP as an organization's capability to absorb and exploit external knowledge where an organization clearly learns through its individual members. This differs from the process of formalizing new knowledge (known as retentive capacity (Szulanski 1996)). There are important benefits to the ability to absorb new external knowledge (Jansen, Van Den Bosch & Volberda 2005). For example, the organization's aspiration can shift from performance measurement to innovation and emerging market opportunities(Cohen & Levinthal 1990). Zahra & George (2002) further refined the ACAP conceptual framework. Research has used this framework at an individual level (Lowik, Kraaijenbrink & Groen 2017). It recognizes the four following different capabilities (Zahra & George 2002):

- Acquisition is where the knowledge object is acquired. Here, identifying the recipient's knowledge gap, trust between all parties, and evaluating available processes and tools are all critical (Jacobs & Buys 2010).
- Assimilation is where the knowledge is extracted from the object (Zahra & George 2002). For this to be effective, the communication channel and processes must be sound (Jacobs & Buys 2010). Here, social integration mechanisms differentiate Assimilation from Transformation as they are part of it.

- Transformation is where processes are re-configured to exploit the newly acquired knowledge. This capability is affected by prior knowledge processes (Jacobs & Buys 2010; Szulanski 2000). Depending on how much the prior knowledge processes are ingrained, it will take more time and effort to unlearn and relearn the new process (Szulanski 2000).
- Exploitation is where the newly absorbed knowledge is used and its value is returned. Exploitation is often viewed as a successful demonstration that the absorption process is complete (Jacobs & Buys 2010).

While these four capabilities are interdependent, Acquisition and Assimilation are considered Potential Absorptive CAPacity (PACAP) because knowledge has still not yet been incorporated (Zahra & George 2002). Transformation and Exploitation are referred to as Realized Absorptive CAPacity (RACAP) as knowledge has been integrated (Zahra & George 2002). Cohen & Levinthal (1990) do not make a distinction between Assimilation and Transformation, instead, they only recognize Assimilation. The ACAP framework is not hard defined, it is dynamic (Zahra & George 2002). A capability is dynamic when its resources and competencies are combined to expand its dimensions to gain an advantage (Teece, Pisano & Shuen 1997). As a dynamic capability is influenced by its environment, antecedents can also affect ACAP differently which can lead to different performance (Jansen, Van Den Bosch & Volberda 2005; Teece, Pisano & Shuen 1997).

Individual's learning cognitive ability was the initiation for conceptualising ACAP (Cohen & Levinthal 1989; Cohen & Levinthal 1990), However, there is not much research about individual's ACAP (Dolmark, Sohaib & Beydoun 2019; Dolmark et al. 2021; Lowik, Kraaijenbrink & Groen 2017; Minbaeva, Mäkelä & Rabbiosi 2012; Yao & Chang 2017). Following the lack of research in this area and the importance of studying absorptive capacity to search for new knowledge and innovation (Da Silva & Davis 2011), this paper's contribution provides significance in the field. Moreover, organizational goals and individual roles are supposedly expected to be fundamentally interdependent (Pradhan & Jena 2017). Cohen and Levinthal (1990, p.131) stated that "an organization's absorptive capacity will depend on the absorptive capacities of its individual members" and that "a firm's absorptive capacity is not simply the sum of the absorptive capacities of its employees".

The Technology Readiness Dimensions Measures Individual's Beliefs

Technology enables the transformation of content and pedagogy that can enhance learning (Hamilton, Rosenberg & Akcaoglu 2016; Koehler et al. 2014). In the early nineties, American campuses introduced assistive technologies to students with learning disabilities (Day & Edwards 1996). These students would still benefit from using these technologies beyond tertiary education (Raskind & Scott 1993). Technologies were meant to support learning (Hamilton, Rosenberg & Akcaoglu 2016).

With the rise of self-serving technologies, the industry required a framework to better profile their customers. In this regards, Parasuraman (2000) proposed the Technology Readiness Index (TRI) which measures people's predisposition towards technology. Said TRI is not to be confused with Technology Readiness Level (TRL), which are different levels of a technology's development and handoff which was first developed by NASA (Sadin, Povinelli & Rosen 1989). Since the TRI original conception, it has been streamlined into a new version which is called TRI 2.0 (Parasuraman & Colby 2015). It retains the four following core dimensions from Parasuraman (2000). Optimism is the belief that technology offers more control, flexibility and efficiency. Innovation is the trend where a technology is a leader or pioneer. Insecurity measures skepticism and distrust towards technology. Discomfort represents the feeling of being overwhelmed by technology and its perceived lack of control. Optimism and Innovation are considered to be motivators as they motivate individuals to use technology (Parasuraman 2000). Optimism here is in the context of technology, whereas the discovery of Szulanski (1996) that motivation was not a barrier is different as it was in the context of knowledge. Insecurity and Discomfort are viewed to be inhibitors as they inhibit technology adoption (Parasuraman 2000). Unlike the Technology Acceptance Model, TR is individual-specific and not system-specific (Lin, Shih & Sher 2007), which aligns with research into individual ACAP.

HYPOTHESIS DEVELOPMENT

Optimism is defined as "a positive view of technology and a belief that it offers people increased control, flexibility, and efficiency in their lives" (Parasuraman 2000). The use of the word 'belief' infers that it is not real but potential. Optimism is a motivator and positive view (Parasuraman 2000; Walczuch, Lemmink & Streukens 2007). As Optimism is a motivator and highly potential, it would be positively associated with individual PACAP.

H1: Optimism is positively related to individual PACAP.

Insecurity is defined as "distrust of technology, stemming from skepticism about its ability to work properly and concerns about its potential harmful consequences" (Parasuraman 2000). The use of the word 'potential' is explicit. Insecurity is an inhibitor and has a strong connotation with negativity (Parasuraman 2000; Walczuch, Lemmink & Streukens 2007).As Insecurity is an inhibitor and also potential, it would be negatively associated with individual PACAP.

H2: Insecurity is negatively related to individual PACAP.

Innovation is defined as "a tendency to be a technology pioneer and thought leader" (Parasuraman 2000). The tense of the sentence implies that Innovation is in the present, hence, it is real. Innovation is initially considered a motivator as it enables opportunity (García-Morales, Ruiz-Moreno & Llorens-Montes 2007; Parasuraman 2000). As Innovation is a motivator and real, it would be positively associated with individual RACAP.

H3: Innovation positively related to individual RACAP.

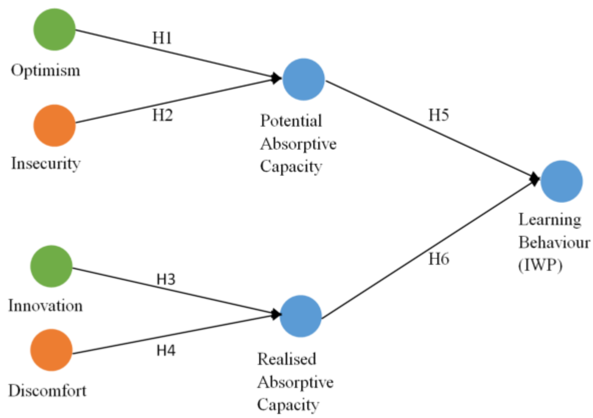
Discomfort is defined as "a perceived lack of control over technology and a feeling of being overwhelmed by it" (Parasuraman 2000). The tense is in the past which suggests that it has been realized. Discomfort is a negative experience (Walczuch, Lemmink & Streukens 2007). As insecurity and discomfort are inhibitors, discomfort would be negatively associated with individual RACAP.

H4: Discomfort is negatively related to individual RACAP.

As the IWP was developed to focus on the behaviour or actions under the control of an employee rather than the outcome and excludes environment constrained behaviours, it can be used to construct generic questionnaires (Koopmans et al. 2013). As behaviour is influenced by beliefs (Ajzen 1991), an individual's behaviour (i.e. IWP) can be used to further assess the effect of an individual's technological belief on their capability to absorb knowledge (ACAP). This would be described as their technological learning behaviour. While PACAP and RACAP are presented as separate constructs, they both belong to ACAP and would affect learning behaviour.

H5: Individual's PACAP affects positively their learning behaviour.
H6: Individual's RACAP affects positively their learning behaviour.

Figure 1. Research model for technology readiness on individual absorptive capacity toward learning behaviour



METHODOLOGY

The data was collected using a web survey and cold face to face advertising from September 2019 to November 2019 at UTS (see Appendix for the specific items used in the survey). The TR scales that measure Optimism, Innovation, Insecurity and Discomfort were taken from Parasuraman & Colby (2015). The ACAP scales that measure Acquisition, Assimilation, Transformation and Exploitation was adapted from Jansen, Van Den Bosch & Volberda (2005), Lowik, Kraaijenbrink & Groen (2017), and Vlačić et al. (2019). The Learning Behaviour scales that measure IWP was modified from Koopmans et al. (2013) and Pradhan & Jena (2017). Records that were neither complete nor studying a university curriculum were filtered out leaving 199 useable records.

This study uses PLS-SEM to test the hypothesis using SmartPLS v3. PLS-SEM has many benefits (Hair, Ringle & Sarstedt 2011). It is suited for predictions and developing theories when the sample size is small (Hair, Ringle & Sarstedt 2011; Hair, Risher & Ringle 2019). It can assess measurements and test relationships between latent variables. This method is less stringent to work with non-normal data and it supports the use of formative indicators (Hair Jr., Sarstedt, et al. 2014). When indicators cause the construct, the construct and indicators are formative.

Acquisition, Assimilation, Transformation and Exploitation are part of PACAP and RACAP (Zahra & George 2002) and are modelled as formative constructs. The TR dimensions measure beliefs (Parasuraman 2000). Learning Behaviour focuses on the behaviour under the control of an employee (Koopmans et al. 2013). The TR dimensions and Learning Behaviour are both about "attitudes" and "behaviours" and thus have been set as reflective.

RESULTS AND DISCUSSION

Demographic

The questionnaire on the web survey had a series of demographic items. These items asked participants about their gender identity, biological age, technological age, their locality and their current education level. Regarding gender identity Participants about "What gender do you identify as ?", 105 of the participants predominantly identified as female, 89 as male, 2 as other whose response were "female sex, no gender" and "genderqueer", and 3 as prefer not to say (See Figure 2.). For biological age, 54 responded to be 18-25 years old, 83 to be 26-35, 27 to be 36-45, and 34 to be above 45 (See Figure 3.). For technological age, participants were asked "How many years have you been using technology

Figure 2. Gender identity distribution pie chart for technology readiness on individual absorptive capacity toward learning behaviour

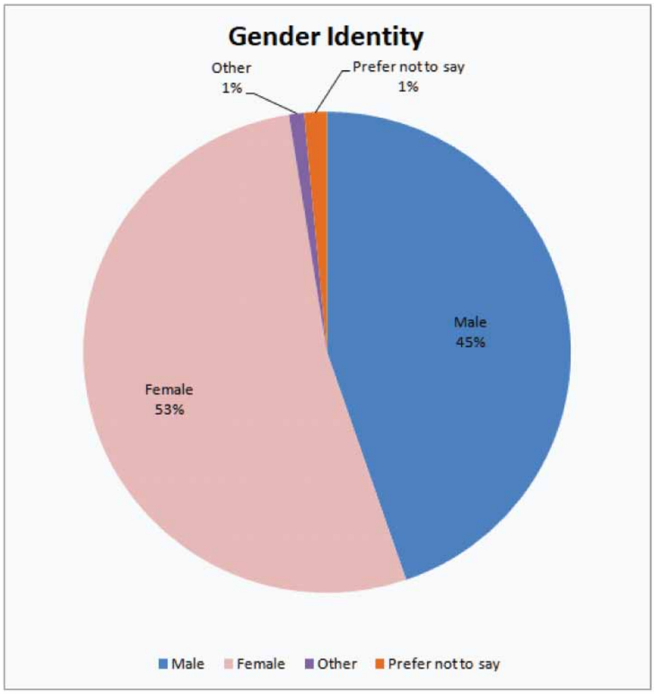
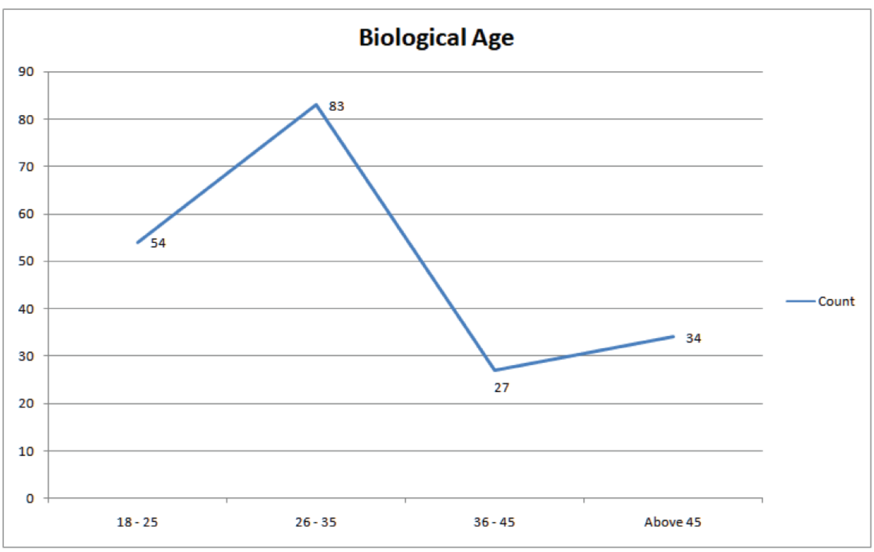


Figure 3. Age range count graph for technology readiness on individual absorptive capacity toward learning behaviour



?" for which 2 answered 1-3 years, 5 answered 4-6 years and 188 answered more than 7 years (See Figure 4.). For locality, participants were asked if they were local students for which 130 answered local, 58 answered international, 9 answered other which included 5 responses that were interstate, 2 from Melbourne, 1 distance education and 1 both, and 2 that preferred not to say (See Figure 5.).

Figure 4. Tech age range count graph for technology readiness on individual absorptive capacity toward learning behaviour

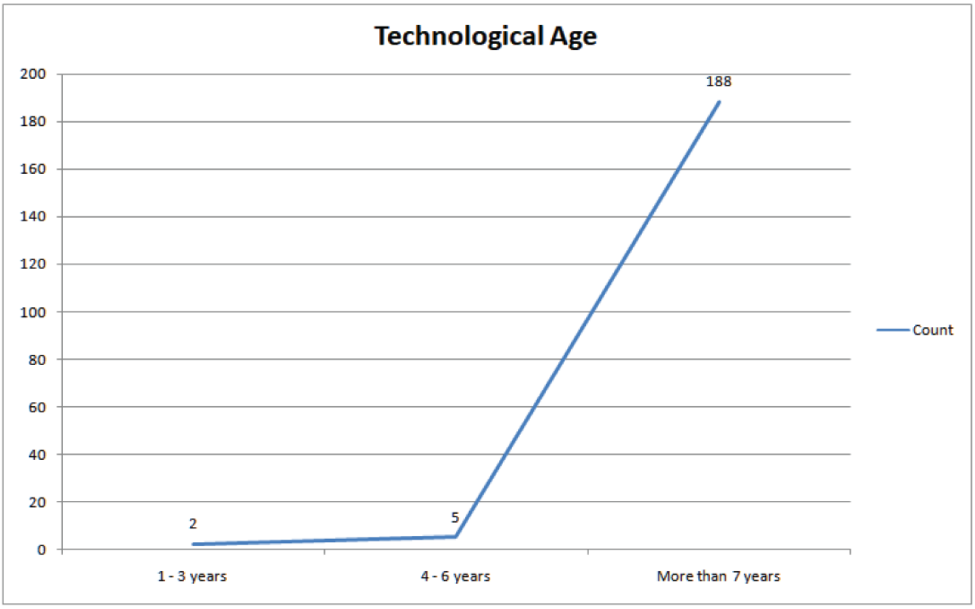
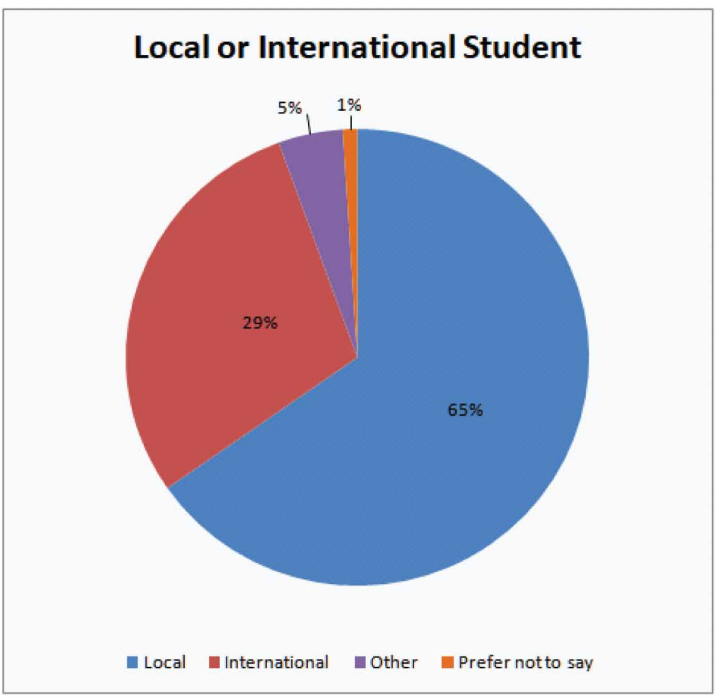


Figure 5. Student provenance distribution pie chart for technology readiness on individual absorptive capacity toward learning behaviour



Participants that were not studying a degree were filtered out leaving 45 who answered studying a bachelor's degree, 13 a Master's degree, and 141 a PhD (See Figure 6.).

The TRI responses were also reversed engineered to segregate the different personas taken from Colby & Parasuraman (2001, pp. 59-60). Explorers are the first adopters of technologies (Colby & Parasuraman 2001, pp. 72-4). Pioneers generally consider the practical aspects of technologies and thus follow explorers (Colby & Parasuraman 2001, pp. 75-7). Sceptics before they adopt a new technology need to be convinced (Colby & Parasuraman 2001, pp. 77-80). Americans also have Paranoids (Tsikriktsis 2004) who are greatly concerned about risk (Colby & Parasuraman 2001, pp. 80-3). And Laggards will only adopt new technology if they are forced to do so (Colby & Parasuraman 2001, pp. 83-6).With optimism as high, insecurity as high, innovation as medium or not low, and discomfort as also not low, this would place the average participant as a pioneer (see Figure 7). Using the same logic with medians, the median participant is also a pioneer (see Figure 7). The difference between pioneer and paranoid was Innovation.

Measurement Model

The reliability and validity of the PLS measurement model were measured using internal consistency, convergent validity and discriminant validity. All reflective indicator loadings are above the threshold (see Figure 8)(Hair Jr., Hult, et al. 2014, p. 103) (Hair Jr., Hult, et al. 2014, p. 103) (Hair Jr., Hult, et al. 2014, p. 103) (Hair Jr., Hult, et al. 2014, p. 103) (Hair Jr., Hult, et al. 2014, p. 103) (Hair Jr., Hult, et al. 2014, p. 103). While the recommended threshold should be above 0.708, all Composite Reliability (CR) and Average Variance Extracted (AVE) are within acceptable thresholds (see Table 1). All CR are above 0.7 and below 0.9 which is "satisfactory to good" and indicates there are no redundant items (Hair, Risher & Ringle 2019). The CR values indicate that the internal consistency is reliable. All reflective indicators AVE are above 0.5 which addresses the convergent validity. Hair,

Figure 6. Current education distribution pie chart for technology readiness on individual absorptive capacity toward learning behaviour

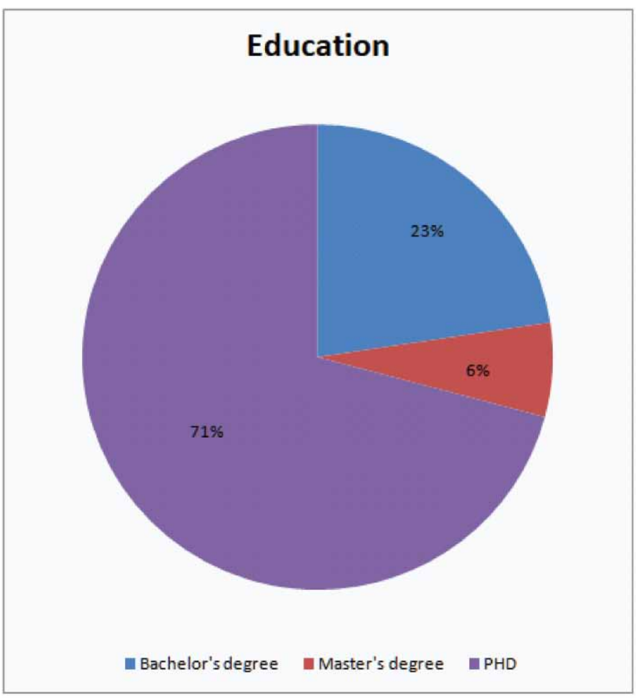


Figure 7. TR dimensions average and median response graph on individual absorptive capacity toward learning behaviour

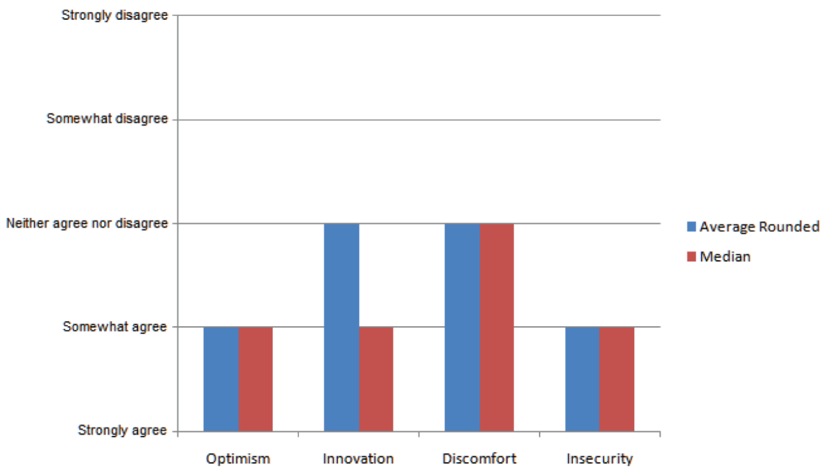


Table 1. Composite reliability and average variance extracted

	Composite Reliability (CR)	Average Variance Extracted (AVE)
Discomfort	0.81	0.52
Innovation	0.86	0.61
Insecurity	0.78	0.55
Learning Behaviour (IWP)	0.80	0.57
Optimism	0.81	0.51

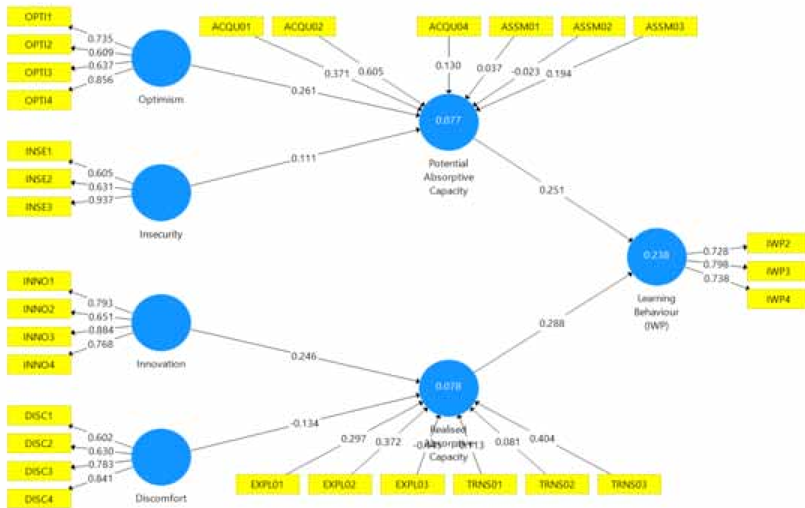
Risher & Ringle (2019) recommended the use of All Heterotrait-Monotrait Ratio (HTMT) to assess the discriminant validity. These values are below the recommended threshold of 0.85 (see Table 2).

Formative indicators whose weights were not significant had their loadings examined. If their loadings were beneath 0.5, but not significant, they were removed, otherwise, if their loadings were significant, they remained (Hair Jr., Hult, et al. 2014, p. 129). None of the weights are above +1 or below -1 (see Figure 8); hence, all formative indicators should be relevant. While collinearity issues can still exist with VIF values below 3, values beneath 3 should ensure that all formative indicators are statistically significant and do not bias the structural model regression results (Hair, Risher &

Table 2. Heterotrait-monotrait ratio

	Discomfort	Innovation	Insecurity	Learning Behaviour	Optimism
Discomfort					
Innovation	0.18				
Insecurity	0.38	0.11			
Learning Behaviour	0.26	0.24	0.15		
Optimism	0.20	0.26	0.26	0.15	

Figure 8. Technology readiness on individual absorptive capacity toward learning behaviour path testing



Ringle 2019). All observed VIF values were beneath 3 (Table 1). Composite Reliability and Average Variance Extracted.

Structural Measurement Model

To test the hypotheses, bootstrapping was executed with '5000' sample, with 'complete bootstrap', and 'Bias-Corrected and Accelerated (BCa) Bootstrap (default)' to reduce skewness. All hypotheses are accepted except H2 and H4 as listed in the supported column in Table 3. The results indicate that the relation between insecurity and PACAP is insignificant. Also, the relation between discomfort and

Table 3. Bootstrapping results for technology readiness on individual absorptive capacity toward learning behaviour

Hypothesis	Path	Path Coefficient	Standard Deviation (STDEV)	T Value (T Statistics)	P Values	Supported ?
H1	Optimism -> Potential Absorptive Capacity	0.26	0.08	3.36	0.00	Yes
H2	Insecurity -> Potential Absorptive Capacity	0.11	0.14	0.80	0.43	No
H3	Innovation -> Realised Absorptive Capacity	0.25	0.06	3.88	0.00	Yes
H4	Discomfort -> Realised Absorptive Capacity	-0.13	0.19	0.70	0.48	No
H5	Potential Absorptive Capacity -> Learning Behaviour (IWP)	0.25	0.08	3.02	0.00	Yes
H6	Realised Absorptive Capacity -> Learning Behaviour (IWP)	0.29	0.09	3.23	0.00	Yes

RACAP is also insignificant. Variance in learning behaviour ($R^2 = 0.238$) is significant. This shows that ACAP has a positive effect between the positive technological beliefs and Learning Behaviour.

Importance-Performance Map Analysis (IPMA)

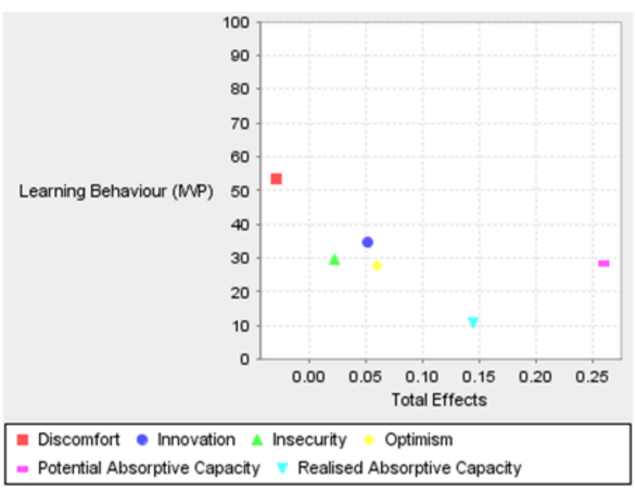
The Importance-Performance Map Analysis (IPMA) identifies the predecessors of a selected construct that are highly important and have low performance (Ringle & Sarstedt 2016). This can guide managers to which activities should take priority as IPMA is used for managerial implication. Importance indicates the impact that a factor has on a selected construct while performance indicates the output of the factor on the selected construct.

The IPMA was run in SmartPLS v3 with the 'Target Construct' set to 'Learning Behaviour (IWP)' and 'All Predecessors of the Selected Target Construct' selected. As shown in Table 4 and Figure 9, Optimism, Innovation and Insecurity have an insignificant importance and moderate performances on Learning Behaviour. Increasing Optimism's and Innovation's performance will not have an impact. As Insecurity is an inhibitor, decreasing its performance will not lead to increase learning behaviour. Discomfort has an insignificant negative importance but high performance which means as an inhibitor, decreasing its performance might not have an impact. PACAP has a weak importance and moderate performance so increasing its performance has not little impact. RACAP has a very weak

Table 4. Importance-performance map [learning behaviour (IWP)] for technology readiness on individual absorptive capacity toward learning behaviour

Factors	Total Effects	Performances
Discomfort	-0.03	53.19
Innovation	0.05	34.50
Insecurity	0.02	29.31
Optimism	0.06	27.74
Potential Absorptive Capacity (PACAP)	0.26	28.53
Realised Absorptive Capacity (RACAP)	0.14	10.77

Figure 9. Importance-performance map [learning behaviour (IWP)] for technology readiness on individual absorptive capacity toward learning behaviour



importance and weak performance hence increasing its performance has no impact. While PACAP has a positive impact on RACAP (Limaj & Bernroider 2019), focusing efforts on increasing PACAP might flow onto RACAP. This means that for Learning Behaviours, increasing PACAP should be a priority as its performance is weak and its importance is the highest.

CONCLUSION

This study provides empirical evidence that individual's technological beliefs affected their capability to absorb knowledge and their learning behaviour. It used the four TR dimensions of Optimism, Innovation, Insecurity and Discomfort to measure individuals' beliefs in technology. It also used the four ACAP capabilities of Acquisition, Assimilation, Transformation and Exploitation to assess the impact of dynamic capability on absorbing knowledge at the individual level. Finally, IWP method measures individual's behaviour in regard to learning.

This study provides both theoretical and empirical evidence and some insight to the effect of technological beliefs onto learning. On the theoretical side, the findings show that Optimism and Innovation have significant positive effect on individual PACAP and RACAP, respectively. This means that increasing these beliefs in students would increase their learning. The effect of Discomfort and Insecurity on individual PACAP and RACAP is insignificant, meaning that decreasing these beliefs would not hinder their learning. However, individual PACAP and RACAP have a positive effect on recipient's Learning Behaviour, thus, increasing a student's PACAP and RACAP would increase their learning behaviour. Also, prioritizing Optimism is important for the performance of Learning Behaviour. Motivating people to use technology would benefit their learning behaviour by a small amount. Encouraging optimism and innovation would yield a positive effect on recipient learning behaviour in the long term. As PACAP has a positive impact on RACAP (Limaj & Bernroider 2019), prioritizing optimism may yield impact on RACAP. As the results show that an individual's technological beliefs has a weak effect on individuals learning, these show that said beliefs are not a driver but an enabler to learning. These results are in line with previous research that discuss that technology can enhance learning (Hamilton, Rosenberg & Akcaoglu 2016) and support students beyond their education (Raskind & Scott 1993).

This study addresses the previously overlooked individual ACAP (Lowik, Kraaijenbrink & Groen 2017; Minbaeva, Mäkelä & Rabbiosi 2012), in an effort to deepen understanding on the existence of multilevel. Our findings revealed strong connections between the TR's optimism and innovation dimensions, as well as ACAP and learning behaviours. Importantly, we realized that improving the individual ACAP is the foundation for developing the ACAP at group, organization, and even inter-organizational levels.

In practice, at university level, pedagogues can use the results of this study in improving their teaching performance by emphasising and highlighting the optimistic and innovative aspect of the technology. This would benefit student's knowledge processing and learning behaviour in the long run. However, leveraging individual's technological beliefs could increase the organization's ACAP, but it is not simply the sum of its individuals' ACAP (Cohen & Levinthal 1990). Future research should reflect on this aspect by considering the heterogeneity in the individual's learning behaviour.

A limitation of this study is that the scope of our sample is limited to the Australian Universities, hence, students are assumed to have high ACAP. Therefore, not many examples of individuals with low ACAP were present in our data. Discomfort and Insecurity have not been established to have any effect on ACAP. These dimensions are usually high in pioneers, paranoids and laggards (Colby & Parasuraman 2001, p.61). Sampling a population predominantly with paranoids and laggards would establish if inhibitors have a negative causal effect on ACAP. On that note, web surveys might discourage paranoids and laggards from participating in such research.

Future research in other disciplines could adapt other belief models to assess their effects on individual ACAP and IWP. There is a lot of research to be made to bridge technology and knowledge along with a long of opportunities and insights to be gained should one pursue this path.

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APPENDIX

Table 5. Survey items

Demographic Items		
ID	**Questions**	**Answers**
DEMG1	What gender do you identify as ?	Male; Female; Other (textfield); Prefer not to say; I do not know
DEMG2	What is your age ?	18-25; 26-35; 36-45; Above 45; Prefer not to say; I do not know
DEMG3	How many years have you been using technology ?	1-3 years; 4-6 years; More than 7 years; Prefer not to say; I do not know
DEMG4	What suburb do you live in ?	Postal Code (textfield); Prefer not to say; I do not know
DEMG5	Are you an international or local student ?	International; Local; Other (textfield); Prefer not to say; I do not know
DEMG6	What are you currently studying ?	Bachelor's degree; Master's degree; PHD; Prefer not to say; I do not know

Table 6. Survey items (cont.)

TRI 2.0		
Optimism	**Item**	**Reference**
OPTI1	New technologies contribute to a better quality of life	(Parasuraman & Colby 2015)
OPTI2	Technology gives me more freedom of mobility	(Parasuraman & Colby 2015)
OPTI3	Technology gives people more control over their daily lives	(Parasuraman & Colby 2015)
OPTI4	Technology makes me more productive in my personal life	(Parasuraman & Colby 2015)
Innovation		
INNO1	Other people come to me for advice on new technologies	(Parasuraman & Colby 2015)
INNO2	In general, I am among the first in my circle of friends to acquire new technology when it appears	(Parasuraman & Colby 2015)
INNO3	I can usually figure out new high-tech products and services without help from others	(Parasuraman & Colby 2015)
INNO4	I keep up with the latest technological developments in my areas of interest	(Parasuraman & Colby 2015)
Discomfort		
DISC1	When I get technical support from a provider of a high-tech product or service, I sometimes feel as if I am being taken advantage of by someone who knows more than I do	(Parasuraman & Colby 2015)
DISC2	Technical support lines are not helpful because they don't explain things in terms I understand	(Parasuraman & Colby 2015)
DISC3	Sometimes, I think that technology systems are not designed for use by ordinary people	(Parasuraman & Colby 2015)
DISC4	There is no such thing as a manual for a high-tech product or service that's written in plain language	(Parasuraman & Colby 2015)
Insecurity		
INSE1	People are too dependent on technology to do things for them	(Parasuraman & Colby 2015)
INSE2	Too much technology distracts people to a point that is harmful	(Parasuraman & Colby 2015)
INSE3	Technology lowers the quality of relationships by reducing personal interaction	(Parasuraman & Colby 2015)
INSE4	I do not feel confident doing business with a place that can only be reached online	(Parasuraman & Colby 2015)

Table 7. Survey items (cont.)

Tools	Item	Reference
TOOLS1	The systems that the university uses to provide course content (for example, Blackboard) seems to be exactly what I need.	(Adeyinka et al. 2010)
TOOLS2	I find that the university's systems are easy to use.	(Kuo & Lee 2009)
TOOLS3	I can effectively and easily manage my time using the university's systems.	(Ozkan, Koseler & Baykal 2009)
TOOLS4	I am informed by announcements through the university's systems.	(Ozkan, Koseler & Baykal 2009)

Table 8. Survey items (cont.)

SN	Item	Reference
SN01	I use social networks to solve my academic problems.	(Gupta & Bashir 2018)
SN02	I use social networks to do research.	(Gupta & Bashir 2018)
SN03	I use social networks to communicate with my friends to prepare for exams.	(Gupta & Bashir 2018)
SN04	I use social networks to seek help from my teachers.	(Gupta & Bashir 2018)
SN05	I use social networks to share new ideas.	(Gupta & Bashir 2018)
SN06	I find it difficult to find accurate information about academia on social networks.	(Gupta & Bashir 2018)
SN07	I usually postpone my academic task to spend more time on social networks.	(Gupta & Bashir 2018)

Table 9. Survey items (cont.)

Social Influences	Item	Reference
SI1	People who are important to me think I should use the university's systems.	(Venkatesh et al. 2003)
SI2	I use the university's systems because of the proportion of students who use them.	(Venkatesh et al. 2003)
SI3	The teachers help me use the university's systems.	(Venkatesh et al. 2003)
SI4	People who use the university's systems have more prestige than those who do not.	(Venkatesh et al. 2003)

Table 10. Survey items (cont.)

ACAP		
Acquisition		
ACQU01	I am always actively looking for new knowledge.	(Lowik, Kraaijenbrink & Groen 2017)
ACQU02	I can easily identify what new knowledge is most valuable.	(Lowik, Kraaijenbrink & Groen 2017)
ACQU03	I collect information through informal means such as talking with students, industry professionals or mentors.	(Jansen, Van Den Bosch & Volberda 2005)
ACQU04	I regularly approach teachers, tutors or other staff.	(Jansen, Van Den Bosch & Volberda 2005)
Assimilation		
ASSM01	I frequently share my new knowledge with other students.	(Lowik, Kraaijenbrink & Groen 2017)
ASSM02	I translate new knowledge in such a way that students understand what I mean.	(Lowik, Kraaijenbrink & Groen 2017)
ASSM03	I maintain relevant knowledge over time.	(Vlačić et al. 2019)
Transformation		
TRNS01	I can turn existing knowledge into new ideas.	(Lowik, Kraaijenbrink & Groen 2017)
TRNS02	I record and store new knowledge for future reference.	(Jansen, Van Den Bosch & Volberda 2005)
TRNS03	I am proficient in repurposing existing knowledge for new uses.	(Vlačić et al. 2019)
Exploitation		
EXPL01	I constantly consider how I can apply new knowledge to improve my work.	(Lowik, Kraaijenbrink & Groen 2017)
EXPL02	I clearly know how activities within their course should be performed.	(Jansen, Van Den Bosch & Volberda 2005)
EXPL03	I have difficulty implementing new knowledge.	(Jansen, Van Den Bosch & Volberda 2005)

Table 11. Survey items (cont.)

Learning Behaviour	Item	Reference
IWP1	I take into account my teacher's wishes in my work.	(Koopmans et al. 2013)
IWP2	I am able to cope well with difficult situations and setbacks.	(Koopmans et al. 2013)
IWP3	I handle assignments without much supervision.	(Pradhan & Jena 2017)
IWP4	I complete my assignments on time.	(Pradhan & Jena 2017)

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