

EMPOWERING ACCOUNTING STUDENTS TO ENHANCE THE SELF-DETERMINATION SKILLS DEMANDED BY THE FOURTH INDUSTRIAL REVOLUTION

I. Karsten*

Department of Educational Psychology

e-mail: ikarsten@uj.ac.za

M. van der Merwe*

Department of Educational Psychology

e-mail: martynvdm@uj.ac.za

K. Steenekamp*

Department of Education and Curriculum Studies

e-mail: karens@uj.ac.za / <http://orcid.org/0000-0002-3089-2498>

*University of Johannesburg

Johannesburg, South Africa

ABSTRACT

This article proffers consideration of multiple factors by higher education institutions to address the complex challenge of preparing students for the changing world of work. We argue that student support should be holistic, offering academic as well as non-academic support and suggest an intervention where 21st Century skills are offered to students, within the intricate context of the fourth industrial revolution (4IR) with its multiple challenges and opportunities. We further argue that an integration of self-determination principles within such an intervention embedded in Self-Determination Theory (SDT) be considered within student education and support. Student integration research (Tinto 2003) underpinned a proposed strategy to answer important questions regarding student support, namely: "What is needed and when?" Complementary to this, the theory of Self-Determination offered a solid conceptual framework where 21st Century skills could practically be implemented and as such answer the question: "How can students be empowered?"

The research followed a design-based process, positioned in the pragmatic paradigm. The methodology of Design Based Research (DBR) is known for creating knowledge to solve real-world problems in a practical manner. The study was conducted with students from a residential South African university and reports mainly on qualitative data from three consecutive cohorts of first-year Accounting students.

This study proposes action to empower students with 21st Century skills through holistic support, embedded in the Self-Determination Theory, within the context of the 4IR.

Keywords: 21st Century skills, Fourth Industrial Revolution, higher education, self-determination theory, student integration

INTRODUCTION

Developments in technology, combined with the rapid movements in the Accounting profession, are forcing higher education (HE) practitioners to reflect on and strategies around their educational practices. Since the purpose of HE institutions is largely to enable students to attain a reputable qualification with both the necessary knowledge and skills to enter their chosen vocations, this is a responsibility not to be taken lightly. The South African Department of Education (1997, 3) describes it as “providing for individual aspirations for self-development to supply high skills levels to the labour market and to generate knowledge that is both social and economic”.

- What then is meant by *high skills levels*? We would argue that these skills include both academic competencies, as well as proficiencies seen as non-academic. The non-academic skills strongly relate to the *Competency Framework* put forth by the “South African Institute of Chartered Accountants” (SAICA), wherein specific guidelines are given to higher education and training providers regarding the characteristics they would like to be developed. These characteristics include demonstration of capabilities in identifying and solving novel problems; critical, analytical and logical thinking; critical insight in assessing economic, demographic, market, and technological forces and their impact; ; a duty to public interest before own; independent and objective behaviour in this regard; a commitment a chosen code of conduct and professional ethics by way of a values-based reasoning system (SAICA 2020).

HE institutions are thus expected by SAICA to purposefully integrate these skills into the teaching and learning content they offer to prospective Chartered Accountants.

Current foci on the fourth industrial revolution and debates on 21st Century skills, further add to the complexity that HE institutions face, in terms of their curricular planning, teaching and learning practices. Additionally, it adds another layer to the support required, if their intention is to develop students who embody knowledge, skills and attitudes seen to be vital to the future of the Accounting profession as envisioned by SAICA, amidst changing contexts.

This article acknowledges the aforementioned as major drivers of endeavours within the HE sector but proffers a position that greater focus on the holistic development and empowerment of students studying towards the Accounting profession is needed. To this end, this article proposes a process that is geared towards the holistic development of students based on SDT. SDT can be utilised to explain how students are motivated psychologically to engage

in their own learning (Martin, Kelly and Terry 2018, 35). SDT thus place the focus on congruent inner needs which would require students to be active and emancipated partners in their own education and support processes. This article argues therefore, that SDT with its focus on the basic psychological needs of people, provides a suitable conceptual framework for student well-being and support.

CONCEPTUAL FRAMEWORK UNDERPINNING THE RESEARCH

The fourth industrial revolution

The fourth industrial revolution (4IR) was coined by Klaus Schwab as the “big idea” that builds on the previous digital revolution, but is very distinct in the sheer speed, magnitude and disruptive impact it potentially could have on current emerging business models based on a “sharing/on-demand” economy (Yang and Cheng 2018). 4IR requires the blending of the emergent technology of artificial intelligence, automation and robotics with the ever-increasing access and use of data and information learners have, due to developments in mobile device technologies. It involves cyber-physical systems (CBSs) which have the potential to take over work currently done (Gleason 2018b, 146). The implications of these advances in learning technologies and access to information are transforming the way people interact with the physical world around them, but also changing the ways in which people learn, live and work globally. In many cases, “jobs, will not go-away”, but will experience significant changes. This does not hold only for unskilled labour, as most pattern-based and routine-work will be transformed and replaced, resulting in less demand for labour in certain areas, and a definitive transformation of the ways of working (Gleason 2018a). The ways in which people go about organising their work and upgrading their skills that are required to stay relevant and effective in the workplace, will undoubtedly impact the quality and efficiency of the work they deliver, and also affect their family-work balance and their experiences of social inclusion.

The implications for the labour market and education are also clear given these rapid new developments of 4IR. Replacement of workers with automation, the subsequent creation of multiple work roles for each work role “lost”, and the skills development to fill these fundamentally different work roles, are all challenges foreseen by a report from the International Labour Organization in the Southeast Asia-Pacific region. Humans, however, remain integral to the process, as their creative and critical abilities make them indispensable in the implementation of 4IR as they will be the “cobots”, working alongside the developed technologies to augment the processes, as Gleason puts it (2018b, 147).

Gleason (2018a) further states that due to the technology-induced economic changes,

institutions of higher education can no longer only be interested in focusing on informational transfer but should shift the weight to developing employees and thinkers who can meet the demands of the changing times. This may align partly with a more “functionalist” view that education only teaches skills and qualities that the current socio-economic reality requires of its citizens (Collins 1971, as cited in Yang and Cheng 2018). In this regard, it appears that the main objectives of HE institutions is to advance capacities for academic achievement, knowledge retention, and evidence-based practice with the outcome of improved learning, community service, and leading a a meaningful and fruitful life (Gleason 2018a). A greater push towards life-long learning is needed and links to the development of skills for the workforce in 4IR, where “learning cannot stop because the institutions progression does” (Gleason 2018a, 7). The dynamic and primary skills required to achieve this goal include analytical thinking, innovation, active learning, creativity and initiative, complex problem solving, critical thinking, creativity, leadership, social influence, emotional intelligence, problem solving, ideation, negotiation and cognitive flexibility amongst others (World Economic Forum 2018). The ability to be responsive and flexible, appear from this perspective to be critical skills in preparing students at HE institutions. In this sense, the emphasis at HE institutions should move beyond only knowledge transfer to be more student-centred and individualised, project-based, with a stronger focus on experiential learning and group/team-focused activities to develop affective and relational skills required by the 4IR. In this regard, one could align with the more critical and culturalist perspectives taken by Yang and Cheng (2018), that one should guard against “certain hegemonic discourses and imaginaries about education” without sensitively understanding the nuances of the socio-cultural domains of education; namely, how meaning is made and what people value and strive for in certain contexts (2018, 43). This begs a critical position on the current discourses on the 4IR which appear to have elite voices with a strong technocratic and future orientation, without taking note of the voices of the more disadvantaged and marginalised (Yang and Cheng 2018, 58).

Further developments in preparing life-long learners are also reported by Gleason (2018b). The author states that while Singapore for example has a reputable education system which prepares excellent science, technology, engineering, and mathematics (STEM) learners, the 4IR foci on creative and critical thinking are not necessarily supported by such preparation. Developments to alter the education in this region should focus on teaching people *the skill to learn*, rather than *content*, to be able to adjust to changing circumstances using human skills and qualities that machine-learning cannot master. What makes us human, like creativity, emotional intelligence, and our flexible and adaptive mindsets, will allow us the cognitive dexterity to negotiate the ever-changing world. In this respect, Gleason cites Brynjolfsson and

McAfee who see humans' role in the future as having the ability to "improve the skills of ideation, large-frame pattern recognition, and complex communication" (2018b, 148). Thus, developing a growth-mindset through focused project-based or problem-based learning, will allow people and students in the context of HE, to develop explorative, creative and flexible ways to address problems of the future. In their proposals for education towards a future economy, Singapore suggested the development and use of "deep skills" as a strategy for its HE institutions. Deep skills were noted as analytical and evaluative abilities, coupled with solving complex problems using collaborative team approaches, which were identified as skills that created value (Gleason 2018b). Gleason further cautions that one should not make the error of equating such skills with vocational education only (2018a).

Further, it is interesting to note that Xing and Marwala state that the core business of HE institutions, irrespective of the era of development one wants to focus on, is quality learning to "sustain the development of society by means of service" (2017, 12). In this endeavour, quality teaching, acquisition of knowledge, and research are also acknowledged, but the utilisation of wearable devices, massive open online courses (MOOCs), blended learning, and in particular the cultivation of innovative talent, are proposed as potential ways to transform teaching and learning to benefit both students and staff. How students are therefore given opportunities and nurtured to develop their latent abilities, is directly associated with the support provided by HE institutions. We argue that such support should embrace the integration of 21st Century skills.

21st Century skills

21st Century skills have become essential with the emerging sophistication of information technologies. There also appear to be differing views and frameworks of what these skills are, but what is common to all, is the notion that these skills refer to the work that people do. With reference to the implied changes of the 4IR, the capabilities of "non-human" entities will keep expanding and eventually encroach on many of the roles people now "own" as being solely reserved for humans. Thus, the "types" of work done by people will continually be redefined and shifted (Dede 2010). Initially, Levy and Murnane (2004 as cited in Dede 2010, 1) proposed that skills "reserved" for humans emphasised expert thinking and complex communication. Included in this expert thinking were metacognitive skills, creative problem-solving skills, the ability to use these as a heuristic, as well as the "reading" of verbal and non-verbal information in the constant adjusting of communication – for example in classrooms where dialogue is often chaotic and unpredictable. Dede (2010) further argues that many of the 21st Century skills are "perennial" but due to the renewed focus created by 4IR, are now becoming even more sophisticated.

In general, the skills regarded as being the most important to consider in the 21st Century

are “critical thinking, creativity, metacognition, problem solving, collaboration, motivation, self-efficacy, conscientiousness, perseverance and determination or even bravery” (Lamb, Maire and Doecke 2017, 3). Several frameworks for the categorisation of 21st Century skills exist in the literature. Some of these frameworks are mentioned next. These frameworks are not meant to be exhaustive or definitive but are merely selections from existing frameworks which allow for articulation with self-determination and motivation, which form the focal point of this article. Frameworks that tend to foreground information and communication technology (ICT) skills are the “Partnership for 21st Century Skills” and the “Assessment and Teaching of 21st Century Learning” (Lamb et al., 2017). These two frameworks are cited often in literature on 21st Century skills.

A framework cited often, is the non-profit organisation “21st Century Learning Skills (P21.org) framework”. The framework for these skills is organised around four main themes namely, learning and innovation skills, information, media and technology skills, core subjects and 21st Century themes, as well as life and career skills (see Figure 1).

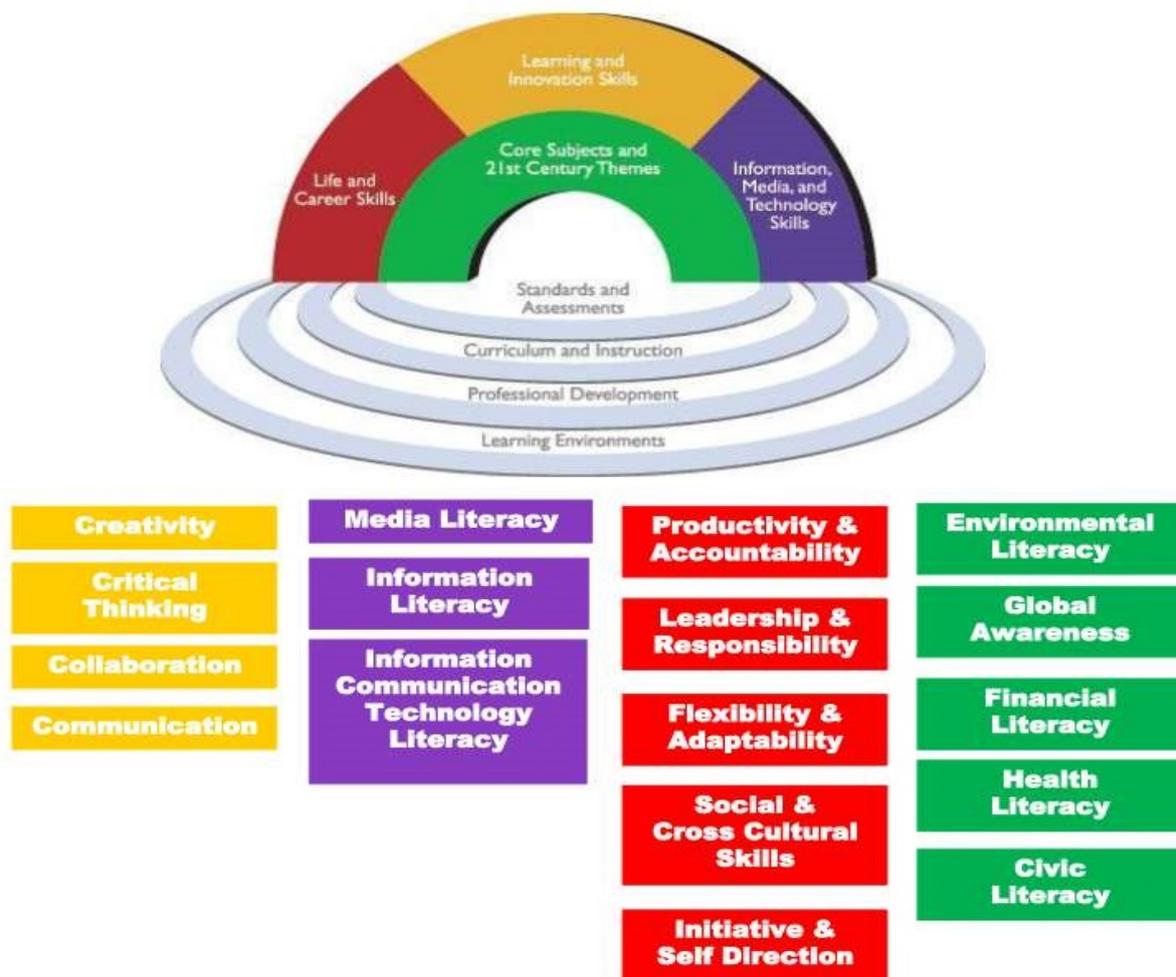


Figure 1: 21st Century skills (Bellisle, P. <https://www.sophia.org/tutorials/21st-century-skills>)

Judging from the perspective of this framework, the identified important skills appear to be features of the learning and innovation skills, and life and career skills themes.

Frameworks which appeared to relate more to the focus of this article, namely the empowering of students towards academic success and integration, focused clearly on the skills that shape student success. These frameworks included the skills of critical thinking, creativity, problem solving, and ICT literacy but also emphasised interpersonal and intrapersonal skills (Lamb et al. 2017, 13; Naidoo and McKay 2018). The “US Partnership for 21st Century Learning (P21)” has three categories of skills of equal parity, namely information, media and technology skills; learning and innovation skills; and life and career skills; whilst the “Assessment and Teaching of 21st Century Skills (ATC21S)” framework has four broad categories of skills, namely ways of thinking (including metacognition); ways of working; tools for thinking (which includes ICT literacy); and living in the world (which includes inter- and intrapersonal skills). The third example of a framework was the “US Committee on Defining Deeper Learning and 21st Century Skills” framework developed by the National Research Council. This framework appeared to align well with the views taken in this article on the skills required in HE within the context of the 4IR. This framework highlighted the essential skills needed to arrive at deeper learning (transferable competencies) and focused on three categories namely, cognitive, intrapersonal and interpersonal (see Figure 2) domains.

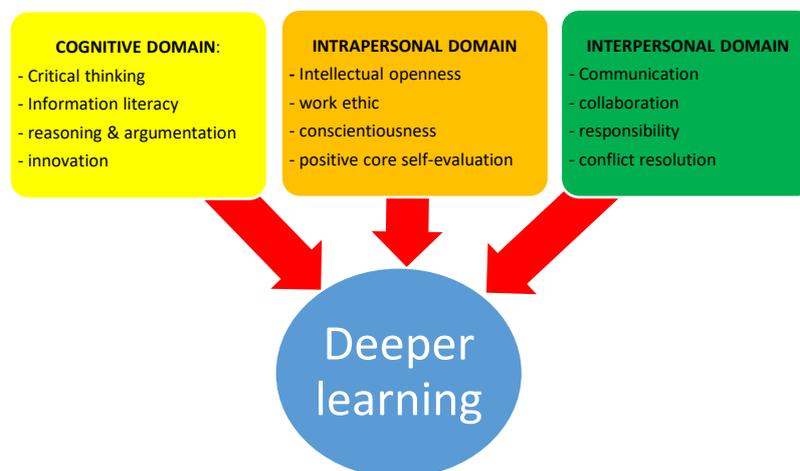


Figure 2: Deep learning skills (Adapted from Pellegrino and Hilton 2012; Lamb et al. 2017)

The final two frameworks relevant in this article were the “University of Chicago Consortium on Chicago School Research” and the “International Study of City Youth project” (Lamb et al. 2017). The latter was inspired by the Chicago Consortium framework.

The Chicago Consortium framework focused on skills needed to be academically

successful in current and future contexts. It was noticeable that this framework positions agency and personal goals as central to these skills and groups the skills into five categories stretching from “academically beneficial dispositions”, to “student behaviours, mediated by learning strategies, perseverance and social skills” (Lamb et al. 2017, 17). What made this framework appealing was its focus on the holistic view of learning and achievement, but even more so as it positions activity or behaviour as the crucial outcomes of all the integrated individual dispositions, skills and strategies.

The “International Study of City Youth project” focused on those skills needed by students to “progress and achieve” but also to transfer these skills to be able to integrate into broader contexts such as the world of work and life in general. The framework was organised into five categories, very similar to the previous framework, but was unique in its incorporation of traditional academic and non-academic skills relevant to the academic context, as shown in Figure 3 (Lamb et al. 2017).

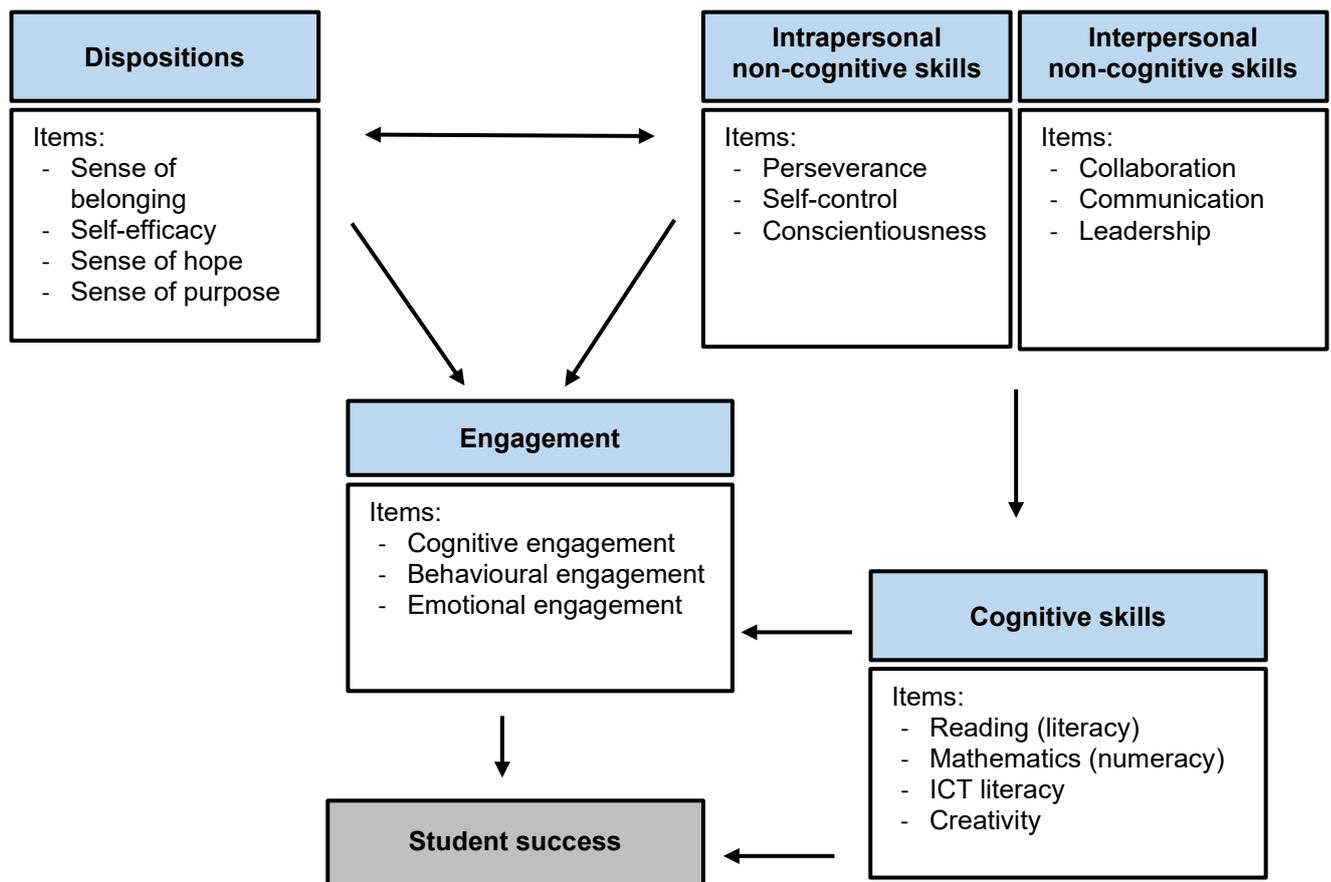


Figure 3: International Study of City Youth Framework for 21st Century Skills (Lamb et al. 2017, 19)

With the focus of this article on self-determination skills to empower accounting students, a

reflection on these frameworks highlighted a number of skills which appeared to point towards the importance of disposition as an important factor. Some of the skills associated with the learning and innovation skills, and life and career skills themes of the “21st Century Learning Skills” (P21.org) framework, appeared to relate strongly to the core psychological needs of autonomy, competence and relatedness for intrinsic motivation. The “US Committee on Defining Deeper Learning and 21st Century Skills” framework appeared to align with competence as a psychological need with a strong focus on the cognitive domain, and an even more discernable alignment with relatedness as a psychological need, as indicated by both the interpersonal and intrapersonal domains. In considering the “International Study of City Youth Framework for 21st Century Skills”, we posited that the three psychological needs were represented well by the dispositional, interpersonal and intrapersonal categories. We also supported the notion that the interrelatedness of these three categories appeared to be crucial in terms of the level of cognitive, emotional and behavioural engagement of students in “self-agency” towards success. Thus, the principles of SDT seemed to be unequivocally interrelated to the challenges and opportunities afforded by the 4IR.

Holistic focus on student integration and support

Student experiences at higher educational institutions are not solely academic in nature (Baumann, Karavdic and Chau 2013, 618; Speckman 2014, 134–139; Naidoo and McKay 2018). Students’ successful navigation of higher education appears to be dependent on a variety of, making student success dependent on a variety of complex inhouse institutional factors, but even more so on students’ unique personal and social factors. Academic and psychological success in higher education institutions are therefore of equal importance and may consequently effect retention rates of HE institutions (Tinto 1993, 83; Tinto 2012, 118).

Tinto’s research on how students integrate into higher education has influenced similar work globally (Berger 2000; Braxton 2000; Kuh and Love 2000; Bean and Eaton 2001; Longden 2004; Pascarella and Terenzini 2005; Karp, Hughes and O’Gara 2010; Van Zyl 2010; Braxton et al. 2014) but is not without critique. No other model to date has significantly challenged his Longitudinal Interactionist model.

Tinto’s study into student integration and retention was undertaken at several American universities in 1975 and formed the foundation of his theory (Longden 2004). His theory is embedded in sociology theory and acknowledges the roles of both academic and social environments in HE contexts. Tinto proposed that students’ adjustment from the “known” to the “new”, involved “a longitudinal process of interactions between an individual with given attributes, skills, financial resources, prior educational experiences and dispositions (intentions

and commitments) and other members of the academic and social systems of the institution” (Tinto 1993, 113).

Tinto’s sociological theory (Tinto 1993) aligns well with psychosocial theories in the sense that students’ unique characteristics and qualities influence their continuous development and progress throughout their journey in HE. Unique characteristics and qualities are used to make sense of the “new” cultural norms and values of the institution where students find themselves. Transitioning into HE environments is of great importance (Longden 2004, 126–127), but does not necessarily progress to internalisation. Integration into HE does however “require the internalisation of new cultural norms and values” (Tinto 2012, 160). Integration refers to “sharing of norms, values and attitudes with others in a specific context. This includes abiding by formal and informal structural requirements for membership in that community or in sub-groups of it” (Pascarella and Terenzini, 2005, 54). This definition foregrounds adjusting to new cultural and institutional beliefs, patterns and conventions (Tinto 2012, 160) and forecasts a positive relationship correlation between academic performance and the ability to assimilate into HE environments (Tinto 1975, as cited in Willcoxson, Cotter and Joy 2011). Thus, the term *integration* implies a progressive journey of entering and becoming a member of value of the new context. Studies often refer to this membership experience as a “sense of belonging” (Hoffman et al. 2002; Karp et al. 2010, 69–86; Tinto 2012, 66–67).

Although Tinto recognises the significance of students’ responsibilities and commitments to their integration process, he assigns the main responsibility thereof to the HE institutions (Tinto 2012, 8). This responsibility, as suggested by the research in this article, should be holistic in nature, thus consisting of not only academic training and support, but also incorporating non-academic skills.

Clear distinction between academic support and social engagement and support in the process of integration is problematic (Speckman and Mandew 2014, 4). Speckman and Mandew opines that, “One does not happen effectively without the other. Students have ‘one head, one heart’ and learning occurs holistically, not in bits and pieces”. Speckman (2014, 136) supports a more holistic approach to integration which includes both academic and psychosocial interventions. Students should therefore be empowered to make informed decisions about their daily personal challenges and “to take responsibility for their actions” in the process from transitioning to integration in HE (Mkhize 2014, 112). This action to *empower* students, directly links to the incorporation of 21st Century skills aimed at student development while they study, but also aims at preparing them for the world of work, and in that, adhering to documents like the Competency Framework of SAICA. Doing this with the added challenges that 4IR brings to the table, needs reflection and careful planning.

To provide structure to this process of student support, Tinto identified three distinct phases (refer to figure 4) (Tinto 1993). The *separation* phase focuses detachment from previous groups and communities and making initial commitment to the university environment, including setting goals for achievement (Longden 2004, 126). During the *transition* phase students continuously revise their engagement and adjust their goals and commitments through longitudinal interactions with the role-players in the context (Pascarella and Terenzini 2005, 54). Persistence in this phase leads students to arrive at greater *integration* goal realisation. Goals include original and ensuing goals at social and academic levels (Tinto 1975, 104).

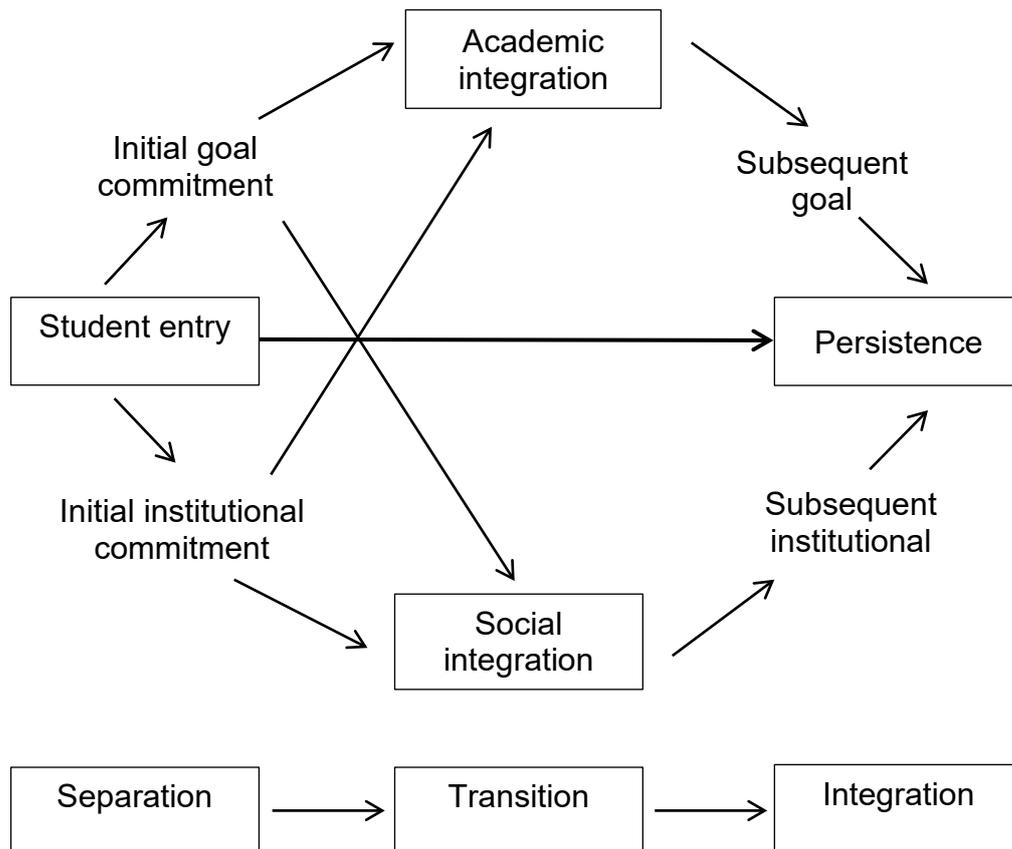


Figure 4: Tinto’s longitudinal interactionist theory (Van Zyl 2010, 83)

When both the student and the institution are committed to achieving the goals of this process, a student can move from separation to transition and should subsequently experience increased levels of integration, which in turn should result in better student academic performance.

Tinto’s model seems to imply a *holistic* focus of student education and support (Tinto 2003, 2; Karp et al. 2010, 69–86). Integration firstly implies academic integration. Academic integration includes adherence to university mandatory academic activities like attending class and completing assessment for example (structural integration), and adherence to the normative structures associated with the academic system, like informal academic engagement with staff

and faculty members (Braxton 2000, 2; Tinto 2003, 2). Academic integration is thus important to foster the intellectual progress of a student (Braxton 2000, 2).

Social integration relates to how students experience being at an HE and provides an indication of how students fit into the institution (Tinto 2003, 4). Their personal contact with academic and administrative staff, the social or sports groups they belong to, and the friendships they form play a role in their social integration. Ultimately, integration at the social and academic levels assumes taking responsibility and determination to achieve academically culmination in graduation (Tinto 1987, 7).

This process is then repeated when a student *separates* from the HE institution, engages in and adapts to the new environment of work (*transition* phase) and then becomes an *integrated* member of their new context or community.

As previously mentioned, the drive towards 4IR implies a skill and value set for students to engage, implement, manage and work with the new-found technological advances. Students cannot be passive recipients of these changes, reliant on the institutional support provided by HE institutions to assist them in dealing with these. Students should actively engage in the process of coming to grips with such changes and its challenges; we are in agreement with authors who propose that most positive outcomes in any performances and in well-being are subject to autonomous, independent reasons and motivation (Yu, Zhang, Nunes and Levesque-Bristol 2018). We support the notion that people are self-determined when what they do is true to their belief of self and aligned with their value systems, leading to their behaviours being integrated into and congruent with their self (Kruger 2018; Yu et al. 2018).

Ryan and Deci (2017, 98) state that the principal aim of SDT is “to specify the factors that subserve and reflect optimal human development”. SDT departs from the notion that people are naturally and inherently motivated to greater sophistication and unification of the self. Van ‘t Hof (2015) supports this as he proposes that “For development to take place people must be exposed to (and actively seek) new challenges and possibilities, which may lead to growth and enhance wellbeing”.

We therefore contend that for holistic student support towards integration in HE both internal and environmental external factors need to be managed for optimal human functioning. This implies that HE institutions and students share the responsibility for integration. Students enter the HE environment as complex beings, necessitating support towards both academic and social development needs (Pather and Chetty 2016; Lekena and Bayaga 2018, 168), including the challenges and opportunities presented by 4IR. SDT as motivational theory influenced by social and contextual aspects may offer insight into how students can be supported to transition and integrate into the HE environment (Karsten 2018).

To this end, a brief exposition of the Self-determination Theory as used in this article, is provided.

Self-determination Theory (SDT)

Deci and Ryan's (1985) Self-determination Theory (SDT) on human motivation and personality is grounded in social psychology, with the emphasis on "the effects of social-contextual factors on human motivation, behaviour, and personality" (Deci and Ryan 2008, 432). SDT is described as a "macro-theory of human motivation, emotion, and development that takes interest in factors that either facilitate or forestall the assimilative and growth-oriented processes in people" (Niemiec and Ryan 2009, 134). SDT compares motivation on a continuum ranging from being controlled to having autonomy; from being involuntarily obliged to act to shaping action through self-choice (Vansteenkiste, Lens and Deci 2006, 19; Ryan and Deci 2017, 9).

To this end, SDT proposes three basic psychological needs which are fundamental in this development process, namely competence, autonomy and relatedness. The theory describes these three needs as inherent in all cultural groups, and across all circumstances (Pintrich 2003, 670; Ryan and Deci 2017, 85). Although there may be variation in how different age groups express these needs, and how these expressions vary from one social environment to another, "their functional necessity is unchanging" (Ryan and Deci 2017, 88). Autonomous, sustainable motivation is achieved when these three psychological needs are nurtured and developed (Stone, Deci and Ryan 2009, 78) (see figure 5).

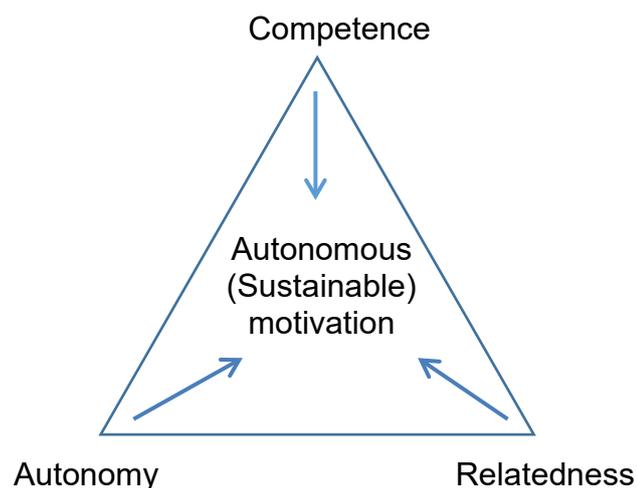


Figure 5: Autonomous motivation (Stone, Deci and Ryan 2009, 78)

According to related research these three needs are vital to function and develop well. Increasing satisfaction of these three needs, will lead to greater contentment and performance. Contrariwise, when there is dissatisfaction with regards to these needs, people may will

experience lower levels of motivation, diligence and personal welfare (Deci and Ryan 2000; Ryan and Deci 2002; Pintrich 2003, 670).

Autonomy is explained as “a desire to be in control or to feel autonomous or self-determining in terms of one’s own behaviour” (Pintrich 2003, 670). Autonomy also implies completing tasks by exercising own choices and the need for psychological freedom (Vansteenkiste and Soenens, 2015, 50). describe autonomy as the need to exercise. Autonomy is thus associated with self-regulation. In this respect Rotgans and Schmidt (2011, 466) extend self-regulation to “having a choice is a means to satisfy that need for autonomy”. Autonomy is not synonymous to independence (Ryan and Deci, 2002, 8). Autonomy, according to these authors, at the experiential level as “Actions that people fully ‘stand behind’ that are experienced as congruent expressions of the self, and that do not involve one part of the personality dominating others, are autonomous actions” (Ryan and Deci 2017, 97). At the functional level, however, autonomy is visible in actions and behaviour, where “[a]utonomous actions more fully engage individual’s talents, abilities and energies” (Ryan and Deci 2017, 98). Autonomy is thus a fundamental concept in their theory as it is vital regulating behaviour, and prerequisite for the fulfilment of the other two needs (Ryan and Deci 2017, 97).

Competence refers to aspiring to control the outcome of situations and to eventually master the skills needed for the interactions and environments successfully (Pintrich 2003, 670; Vansteenkiste and Soenens, 2015, 51). Ryan and Deci (2017, 95) suggest that competence is more than the acquisition or enhancement of skills. They highlight the potential joy and satisfaction that accompany the experience thereof: “As a psychological need, competence is not only functionally important but is also experientially significant to the self” (Ryan and Deci 2017, 95). Competence thus refers to more than related concepts like “efficacy, optimism, achievement motivation, success expectancies, and many other terms” (Ryan and Deci 2017, 96). The need for achieving competence becomes an internal locus which favours correspondence between task-level and believed skillset, resulting in clarity of goal-setting and perseverance in the development of abilities towards achieving such goals (Ryan and Deci 2002, 7). Competency is therefore an essential part of psychological well-being.

Relatedness is of psychological significance to human motivation and well-being. People generally have the need to and sense of connecting or interacting with others, and to feel appreciated, loved and cared for (Baumeister and Leary 1995; Ryan and Deci 2002, 7; 2017, 11; Vansteenkiste and Soenens, 2015, 51). *Relatedness* is experienced on two levels. Firstly, interaction with others to form friendships help our social orientation (Lekena and Bayaga 2018). Secondly, on a deeper level, “the feeling of belonging and of being significant or mattering in the eyes of others” (Ryan and Deci 2017, 96) helps us to become more integrated

in our environments (Hoffman et al. 2002; Karp et al. 2010, 69–86; Tinto 2012, 66–67).

We thus arrive at the view that motivation towards optimal functioning is reliant on satisfaction of these fundamental human needs. Furthermore, Ryan and Deci (2017, 95) claim that “the need for competence supplies the energy for this process of learning”. This applicable to students who are aiming to succeed in their studies at HE institutions. Experiences of academic success thus may lead to greater self-belief, igniting greater motivation and self-determination to take control of their learning and to engage cognitively (Rotgans and Schmidt 2011, 466).

The learning surroundings and circumstances as the extended context of HE institutions, is also important. A study by Müller and Louw (2004, 186), conducted within a South African context, suggests that student learning and supportive learning environments are positively associated when such environments aim at addressing students’ basic psychological needs. Other researchers in the South African HE context (compare Swart and Greyling 2011, 92–93; Alexander 2016, 71–72), agree with this finding and underline the importance of students finding *satisfaction* in their learning, highlighting the importance of self-determination skills to adjusting to university, and to supporting their learning process within this context.

A visual representation of how the fundamental psychological needs of SDT, the 21st Century priority skills in the advent of 4IR and the requirements of SAICA specifically for accounting students interrelate, is attempted in Figure 6.

SELF-DETERMINATION NEEDS			
SAICA characteristics	Autonomy	Competence	Relatedness
Identify and solve unfamiliar problems in situations	Decision making	Problem-solving Critical thinking Creativity	
Think logically, reason and analyse critically	Decision making	Critical thinking	
Understand impact of economic, demographic, market and technological forces	Taking initiative	Creativity	Emotional intelligence Communication
Put interests of public before their own	Decision making Critical thinking		
Exercise skills in independent and objective manner	Decision making	Collaboration Creativity	
Obligatory abide by a self-imposed code of conduct and professional ethics	Decision making	Ethical mindset	Emotional intelligence Communication
Respond to ethical and moral issues through values-based reasoning system			
21 st CENTURY PRIORITY SKILLS			

Figure 6: Visual representation of interrelatedness between psychological needs, skills and requirements

METHODOLOGY

The methodology used in this exploratory study investigated the support needs of first-year Accounting students at the University of Johannesburg. A survey was designed and administered to all first-year students who were registered for the module Accounting 1A in 2014. Biographical information from 1008 completed surveys showed that:

- 44.5 per cent of students were first-generation students, and
- 66.5 per cent came from households with a combined income of less than R15 000 per month (19.3% from a household income of less than R2000 pm).

Follow-up interviews with selected students revealed that they experienced the following challenges as first-year students:

- Difficulty in social adjustment at University
- They found the HE environment unfamiliar and overwhelming
- The new academic demands were difficult to adapt to
- A lack of autonomy
- Low competency levels in interpersonal relationships

Further individual follow-up interviews with selected students confirmed the need for students to be better at problem solving, at thinking creatively, at communicating more effectively, and at applying themselves on an emotional level.

The supposition was that when these skills are combined with principles of SDT, they could offer holistic and relevant development opportunities to empower students to cope with their studies, and to be better prepared for the world of work.

An intervention combining 21st Century skills with SDT were facilitated to the 2015 and 2016 cohorts of Accounting students who were part of the Thuthuka Educational Upliftment Fund. The intervention was implemented, feedback was incorporated into the intervention as improvements, and the process was repeated, following the iterative cycles of DBR. This study was positioned in the Pragmatic paradigm and focused on the design of new knowledge to support students entering HE to integrate academically and socially.

This study was limited in the sense that it was mainly qualitative in nature. More quantitative data could have strengthened the arguments around holistic support and provided a clearer picture on the background of the students. Another limitation is that the study was

only conducted at one institution. Multiple institutions could have enriched the study greatly.

FINDINGS AND DISCUSSION

The intervention was implemented in 2015 and again, with some improvements in 2016. The participants from both cohorts reported significant levels of increase in their self-knowledge, personal management competencies and general well-being as a result of the intervention. They specifically reported great value from the following clusters of activities:

- Social activities building their interpersonal competencies and addressing their underlying psychological need of relatedness. These also include activities which aimed at the development of communication and emotional management.
- General self-management activities which focused on students' autonomy in managing their daily lives as students. Examples of these are intervention activities that addressed the topics of personal finance, time-management and study-management.
- Health and life-style sessions, including an information session on HIV and Aids.

Figure 7 displays the academic averages for 2015 and 2016. The Thuthuka participants performed substantially better in their year-end assessments than their counterparts who were not participants in the intervention.

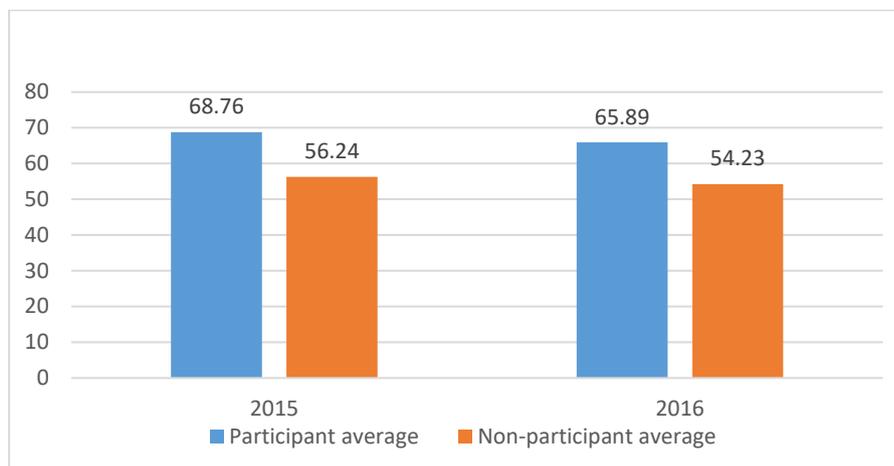


Figure 7: Academic averages for 2015 and 2016 (Karsten 2018)

However, although the participants indicated that they experienced the intervention as beneficial, they reported continuously grappling with several 21st Century skills.

Students indicated that their time-management skills improved due to the intervention, but

that they were still finding it difficult to optimally manage their time. Most students could not present timetables when requested to do so, were not on time for several lectures and did not submit assignments on time.

A skill that is critical in the HE context, both as a 21st Century skill and within the 4IR environment, is communication. The ability to communicate effectively and successfully falls mainly into the relatedness category of the psychological needs of SDT. It goes hand in hand with emotional intelligence and is a needed skill also when the student exits the HE environment. Comments from students after the intervention were positive and they reported great benefit from the sessions and activities. Nevertheless, their feedback included a desire for more of these practical sessions. Additionally, during follow-up consultation, many of them reported that they had not really made good friends, even into their second year of study.

Critical thinking was not addressed in the intervention as an alone-standing topic, but rather integrated into other themes like time-management, personal well-being, entrepreneurship and several social learning activities. In most of these, students were confronted with scenario-type problems to solve. It was observed and reported by members of the research team that there was that participants continued to have difficulty with critical thinking and confidently presenting viable solutions to problems. Improvement in critical thinking was however more evident in the senior year students.

These examples can point to the need for a more integrated approach to skills development and student support, in other words, confirming SAICA's call to compliment the academic curriculum with the inclusion of pervasive skills. Recurring problems identified by both the students and the academic support-providers at the same university, were on topics of personal management, solving general problems and communication skills. This then resulted in the design of a proposed model for empowering students to enhance the self-determination skills demanded by the 4IR. This model is seen in Figure 8, suggesting a student's movement through the HE context, which lies within the bigger 4IR context. It further suggests a DBR intervention which is iterative, holistic, designed according to 21st Century skills, and embedded in the psychological needs of SDT. If successful, the student will then exit the HE environment, more equipped and empowered to enter the world of work.

As a result of the DBR process, several relevant design principles were identified as crucial in student education and support.

The main principles relevant to the process of empowering students to be more equipped within their HE environments, and to be more prepared to enter the changing world of work, included:

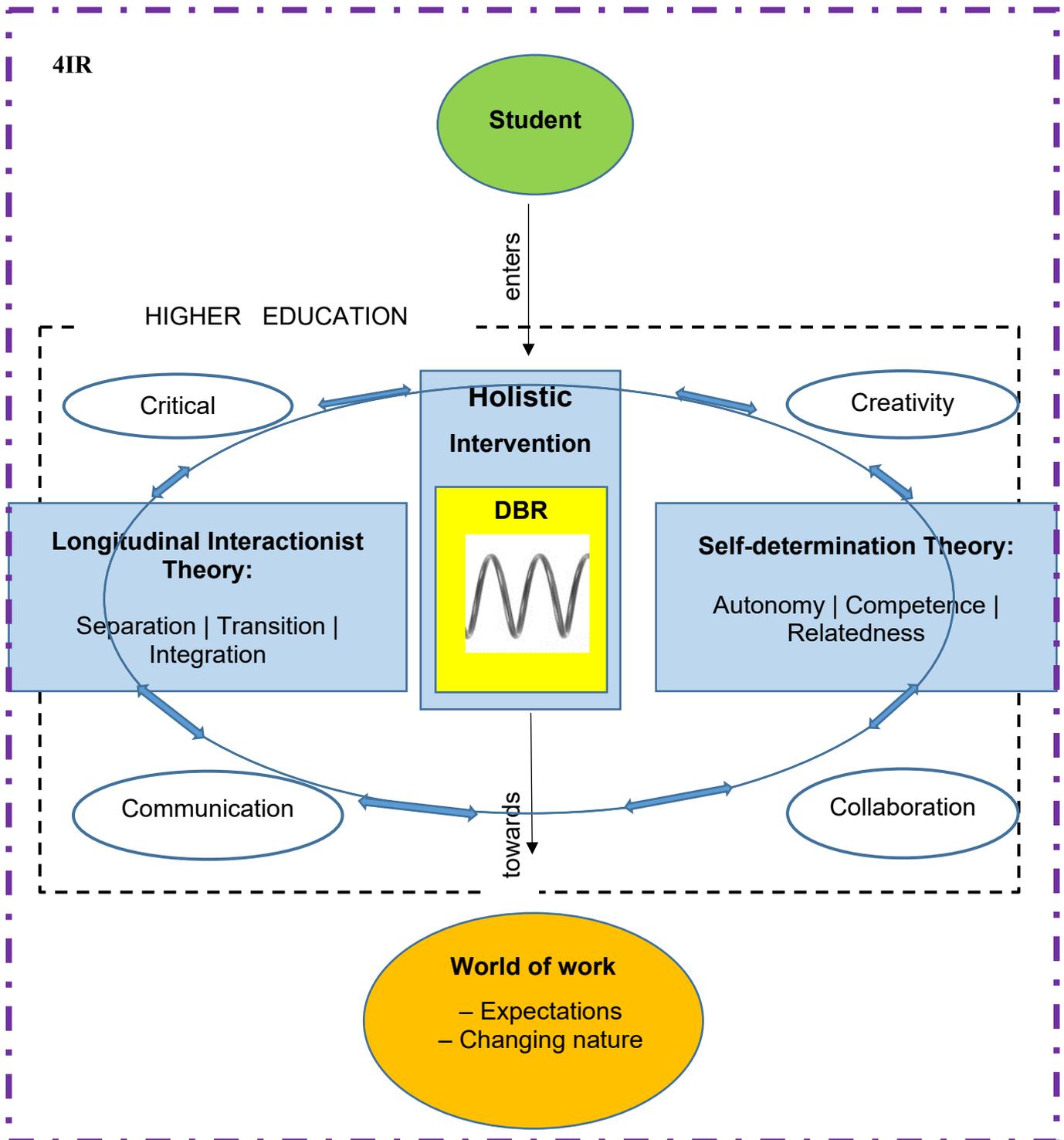


Figure 8: Proposed model for empowering students to enhance the self-determination skills demanded by the 4IR

- 1) Acknowledging and considering the demands and development of the environments in which students, and later employees, find themselves. For this study it was the HE context, with the accompanying changing environment of the 4IR.
- 2) Empowering students holistically, thus with academic skills, but also towards specific

non-academic goals. Doing this requires *intentional* and *structured* action.

- 3) Utilizing senior students to influence junior students is very valuable. These can be as tutors, mentors or in other roles of support.
- 4) Integrating *self-determination* needs as an empowerment strategy is deemed essential to the success of the intervention. SDT as a conceptual framework provided a solid foundation for student support in HE contexts.
- 5) Regular assessment of the intervention is needed to gauge relevancy and its contribution, given the continuously changing nature of HE contexts and the world of work.

CONCLUSION

HE institutions have the great task of supporting their students to not only achieve their qualifications at a high standard, but also to send them into the world of work empowered to cope with the challenges it brings.

Built on the work of Tinto's Longitudinal Interactionist model, we addressed the question: "What is needed and when?" and complemented by the theory of Self-determination as conceptual frameworks, this study presented preliminary research with several suggestions to implement 21st Century skills in a practical way. It aimed at answering the question: "How can students be empowered?"

This methodology followed a design-based process to investigate students' needs and then resulted in the design of an intervention to be implemented as a strategy for student development and support. It resulted in several design principles supporting the notion that student support should be holistic, aimed at integrating 21st Century skills which are offered to students within the complicated and rapidly changing context of the 4IR.

This study thus proposes an integrated, incremental developmental process which could be scalable to different contexts and situations as is expected in a future which requires agency, accountability and grit. The implementation of this proposed process is suggested as the topic for further studies, also through the methodology of DBR. The hope is that it will prove beneficial to the students themselves and to the greater context of the world of work.

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