

Transforming Academic Library Services for At-risk Students in the Fourth Industrial Revolution: A Literature Review

Vicki Lawal

<https://orcid.org/0000-0002-3967-0349>

University of Fort Hare, South Africa

ladilaw@gmail.com

Abstract

This paper examines academic library services to at-risk students in the Fourth Industrial Revolution (4IR). It aims to explore theoretical approaches that can direct more targeted support and service models as an intervention for students who are at risk of failure. The paper specifically analyses Nan Lin's concept of social capital theory with its particular emphasis on social network analysis. The study which directed this paper, employed a conceptual analysis as a methodology by which the literature review was used as a basis for analysing the research questions of the paper. Outcomes from the analysis indicate that Lin's concept of social capital theory has the potential to provide a method for measuring social capital that can be assessed against information seeking outcomes. Recommendations suggest the importance of the theory as a methodological tool for investigating relationships between individuals and their social contexts, which could also be adopted by academic libraries in higher education to enhance students' learning outcomes and educational experience in the 4IR.

Keywords: academic libraries; at-risk students; Fourth Industrial Revolution (4IR); social capital theory; higher education

Introduction

Libraries exist to support the communities or organisations of which they are part by providing efficient access to information resources and services. The value of academic libraries is specifically hinged on the relevance of the information services they provide in support of teaching, learning and research. Among the many concerns that have arisen for academic libraries in the current transformations in digital technologies, is the increasing digital exclusion of disadvantaged groups within the demographics of library clientele (Angell 2017). With the increasing organisation of information sources into digital forms and the gradual integration of internet use into everyday life, the challenge of digital inclusion for most academic libraries is the need to bring closer the benefits of Information and Communication Technology (ICT) and opportunities of the knowledge economy to such disadvantaged groups by continually redefining themselves as vital instruments for encouraging enhanced learning—especially in the context of the Fourth Industrial Revolution (4IR).

It is difficult to purely define the concept of at-risk students due to the cluster of issues that constitute their categorisation; basically, however, at-risk students refer to those predisposed to fail or voluntarily drop out of school. Mngomezulu (2014, 10, 11) defines at-risk students as those in any year of study whose academic performance is unsatisfactory and who are less likely to complete their programmes within the stipulated time frame. Among the many factors for the categorisation of at-risk students are certain challenges which may include financial conditions, family background, low governmental support, low qualifications, teen parenthood, homelessness, low self-esteem, drug or alcohol abuse, poor health or nutrition, lack of family and community support, educational underachievement, poverty, and so forth (Mngomezulu and Ramrathan 2015, 116). Essentially, a combination of socio-economic, environmental, behavioural and other cognitive factors is seen to be at the core of the many problems that contribute to students being at risk. By these conditions, they are seen to lack the requisite skills needed for success in higher education; and if they do graduate, studies have shown that they often lack the knowledge, skills and self-esteem necessary to exercise meaningful options in the areas of work, leisure, culture, civic affairs and inter/intra personal relationships (Mayet 2016, 4). This situation has also led to other problems of social exclusion and growing inequality in the socio-economic status of this category of students.

In the current context of the 4IR, what has become most significant for academic libraries with respect to at-risk students, is the need to bridge the digital divide between access and the ability to efficiently use information resources (Angell, 2017; Switzer 2008, 297). Consequently, the role that academic libraries in Higher Education Institutions (HEIs) can play in providing the needed support towards addressing some of the challenges experienced by at-risk students in the 4IR, has become more substantive (Gavigan and Kurrt 2010, 11).

The objective of this paper is to explore theoretical approaches that can direct more targeted support service models which can be adopted by academic libraries as an intervention for students who are at risk of failure, in ways that can support them in the 4IR. Consequently, this paper is a narrative based on the following research questions:

1. What is the nature of academic library services to at-risk students in HEIs?
2. What theoretical approach can be adopted to inform transformative interventions in library and information services for at-risk students in HEIs?
3. What strategies can be adopted by academic libraries in the 4IR toward transforming existing services for at-risk students?

Contextualisation

Academic libraries in HEIs aim at supporting their institutional priorities by connecting all aspects of library services in ways that contribute to institutional goals, particularly in relation to student engagement with information resources. By providing ideal learning spaces and integrating library-related services to the curricula, they enable an information environment that enhances the effectiveness of collaborative partnerships with discipline faculty towards the attainment of more positive student learning outcomes (Scheuler 2016, 1). Globally today, academic libraries are also redesigning their services and spaces for their student populations in order to enhance user experience in the digital information context (Lawal 2018). The demands of the 21st century knowledge economy and the 4IR require the inculcation of information literacy (IL) skills, interdisciplinary thinking and creative problem-solving skills, for which academic libraries have the potential to impact on their various categories of student users (Lippincott, Vedantham, and Duckett 2014).

Academic Library Services in the 4IR

The 4IR indicates a fundamental change in the way advanced technology is intertwined with every aspect of human existence. Among the major drivers to the 4IR are big data, artificial intelligence and machine learning, real-time analysis, robots, sensors, nanotechnology, 3D printing, Internet of Things (IoT), numerous smart devices, cyber security and visualisation, biotechnology, renewable energy, and so forth (Savić 2017, 1). The anticipation from this range of new technologies is that they fuse the physical, digital and biological worlds, thereby affecting all disciplines, economies and industries, and even challenging ideas about what it means to be human (Frederick 2016, 10; Schwab 2015). This period of industrial development is characterised by creating new hi-tech industrial processes that would bring unprecedented advances in all fields of human endeavour. For HEIs, the 4IR has become a subject of intense debate as it presents a great opportunity for charting new patterns of socio-economic development and re-shaping societal transitions necessary to adjust to a more globally networked information environment through new methods of teaching and research (Butler-Adam 2018; Dempsey and Malpas 2018, 66; Penprase, 2018). The future of academic libraries

has also come into focus, as their growth is dependent on their institutional advancement (Frederick 2016, 11). Among the many disruptive changes expected to transform library services in the 4IR are:

1. Innovative services in the delivery of digital knowledge supplied at a lower cost to customers.
2. The growing mass of non-proprietary or freely accessible data on the web.
3. The provision of functionally rich products and systems that attract customers to use them continuously.
4. Highly skilled librarians who are information brokers in data creation and information management and are able to provide universal access to information and scholarly works in all formats.
5. Preservation and provision of access to information in all formats and providing trusted and effective support for political and social engagement.

As also noted by Frederick (2016, 9), these processes represent an increasing use of Industry 4.0-style technologies and processes applied to the execution of routine library work and services for patrons, indicating endless possibilities in the role and function of librarians. Transformations in the 4IR, therefore, represent a re-examination of current services and indicate another digital shift to newer models of library and information services in order to meet changing user expectations and facilitate a better connection between academic library practices and educational outcomes (Dempsey and Malpas 2018, 67). The ability to adopt and integrate new digital technologies that upgrade user service operations and encourage more creative approaches to patron utilisation of information resources, is a priority towards this goal. For disadvantaged user groups such as at-risk students, academic libraries must, therefore, seek to play a critical role in their success by investing in their capabilities and helping them to engage more meaningfully with the evolving digital information environment (Ahmat and Hanipah 2018, 55).

Conceptualisation

In HEIs, studies in the conceptual field of at-risk students have reflected the various dimensions by which the issue has been approached by researchers in the effort to proffer solutions. The implications for academic libraries in HEIs on the phenomenon of at-risk students are specifically linked with the librarian values of ensuring equitable access and providing a supportive role to students' educational aspirations—irrespective of educational background or social status (Agada 2001, 84). The literature reviewed in this section analyses studies that highlight the role of academic libraries in supporting at-risk students in HEIs.

At-risk students are known to have the tendency to present a range of social and behavioural problems, including learning difficulties. While studies have shown that there are multiple factors that can be attributed to this profile, other researchers have

argued that it is more important to understand the cultural and contextual factors that influence risk behaviour and the degree to which they influence risk behaviours in order for appropriate interventions to be proffered (Agada 2001, 83; Mngomezulu 2014, 10). Mngomezulu and Ramathan (2015, 121), in their study on the academic intervention experiences of at-risk students in South Africa, advocate that factors related to student underperformance in undergraduate studies need to be explored in greater depth in order to understand the dynamics of poor academic performance. Consequently, theoretical perspectives aimed at addressing challenges of at-risk students in HEIs have sought to identify contextual factors that influence risk behaviour in order for appropriate interventions to be proffered.

The role of academic libraries in ensuring the retention of students who are at risk of dropping out, have also been explored by LIS researchers. Allen (2014, 7) noted that academic libraries are developing strategies to support their institutions to retain students through such services as providing comfortable library facilities, student employment in the library, and inter-departmental partnerships as effective library strategies to prevent student drop-out rates. Murray, Ireland and Hackathorn (2016, 631) examined the predictive relationship between library use by individual students and their retention status in university settings. They observed that among other things, providing specific library services such as physical library collections, library electronic resources, library computer lab usage, use of interlibrary loan/document delivery, participation in library instruction sessions, enrolment in credit-bearing IL courses, and so forth, have a strong predictive relationship on student retention in HEIs (Ilett 2019, 178; Oliveira 2016, 2).

Similarly, De Jager et al. (2018, 1, 4), undertook a pioneering study in South Africa to document the link between student behaviour and academic performance in the wake of the 2016 “#FeesMustFall” movement. The study investigated the effects of library closures at a critical time in the academic year on student performance. Even though the findings did not indicate a correlation between library use and student achievement, the authors identified that the provision of an accepting and academically-supportive library environment could encourage self-directed learning and enhance the development of library habits among disadvantaged students in ways that highlight the value of academic libraries’ support to institutional student retention efforts (Chiware 2014, 28; De Jager 2015, 289).

Efforts in assisting at-risk students by academic libraries have also been channelled towards improving their research skills through IL instructional programmes, to enable them to build capacity in navigating online resources/tools and use library facilities for collaborative learning (Gavigan and Kurtts 2010, 11; Lippincott et al. 2014). Mayet’s (2016, 1, 2) study investigated some of the skills-related challenges experienced by at-risk students in their first year at university. He explored the possibilities of adopting learning development interventions as a method by which students’ skills, attitudes and confidence levels can be encouraged by academic counsellors in order to develop the

capabilities and competencies of at-risk learners. Kvenild (2012), in an earlier study, explored the concept of embedded librarianship, a method aimed at working outside of traditional library boundaries as a way of engaging and building a relationship with specific groups of students who are challenged in their learning and research skills. Such practices by academic libraries in partnership with discipline faculty, particularly through course management systems, can help in providing information services that are highly customised and targeted to the information needs of at-risk students (Drewes and Hoffman 2010, 75; Oakleaf 2010, 32).

Global developments in ICT are compelling libraries to continually embrace digital innovations in order to harness their potential for more efficient services. Dempsey and Malpas (2018, 65), in their article, observe that changing patterns of research and learning in HEIs occasioned by developments in the 4IR are likely to have a long-term influence on the impact of academic library services. As HEIs become increasingly integrated with internet-based learning and the deployment of technology, academic libraries will be forced to re-shape their focus to align with their institutional goals. New models of library services will mean that the quality of library services is no longer measured by the size of collections but the ability to inform user experiences in terms of collaborative work, access to specialist materials, instructional design modules, skills training, and so forth, within a richly networked information environment (Darling-Hammond, Zielezinski, and Goldman 2014, 7).

In the context of the 4IR, teaching and research processes and user expectations in HEIs require newer models of academic library services, particularly for disadvantaged students. At-risk students often face challenges of adapting to a virtual learning environment, both in terms of access and ability, and are likely to experience a second level of digital divide in this regard (Angell 2017). Academic libraries will, therefore, need to increase digital literacy instruction as a strategy to close the achievement gap and improve student learning outcomes. Developing new collaborative learning spaces for example, also require designing new IL instructional programmes and other standard reference services to assist students who are struggling to interact with new forms of digital tools and technologies. Well-designed models of user instruction can help students who are at risk of digital exclusion understand how the future world of new technologies work; and will develop the needed skills for the emerging job market (Angell 2017; Dempsey and Malpas 2018, 70; Shahroom and Hussin 2018, 317).

In summary, intervention programmes are usually aimed at assisting students in making a seamless transition to learning at university in order to achieve their desired qualification, regardless of race, schooling background or socio-economic status. Academic libraries can thus partner with academic counsellors, discipline faculty, student administrators and other stakeholders to support at-risk students in attaining a greater measure of skills competence—and in that way also influence pedagogical and curricular changes towards minimising student drop-out rates (Allen 2014, 17; Hanover Research 2020, 8; Oliviera 2016, 5). With emerging developments in the 4IR, the need

for academic libraries to investigate new and creative approaches to utilising educational innovation to upgrade future learning in HEIs, is inevitable. However, such technological transformations in the services of academic libraries must include a deep consideration for at-risk students by ensuring the elimination of the gap in access and the ability to evolving digital innovations through efficient skills development.

Theoretical Context

Theoretical approaches to research have been used to determine how intervention programmes or initiatives can be designed, executed and evaluated against expected outcomes to identified challenges. According to Rempel and Markland (2018), the use of theories provides a basis to critically examine our own contexts and to apply relevant ideas to identified needs. The value of exploring such theoretical approaches is to help investigate their validity in informing policies for possible positive outcomes for intervention. This aspect of the paper examines social capital theory and the prospects of its applicability as an approach to address challenges of at-risk students by academic libraries in HEIs.

Social Capital Theory

Social capital represents resources or assets rooted in an individual's or group's network of social relations (Ali-Hassan 2009, 420). As a theory, social capital has multiple definitions, interpretations and uses and has been used to describe relational resources embedded in personal ties that indicate the connections among individuals and their social networks (Putnam 2000, 20). At the core of the different perspectives used to define social capital are the components of trust, social networks, resources, information, norms and reciprocity, which constitute its value and characteristics. As illuminated by Cloete (2014, 2), there are three main components that contribute to the theory of social capital:

1. The social networks or groups of people with whom an individual interacts.
2. The shared norms and values of each group.
3. The degree to which trust or reciprocal sharing takes place in those relationships.

Definitions of the concept are, therefore, focused on the degree to which these elements can be used as a resource for the public good or for the benefit of individuals in building trust, reciprocity and networks (Hart 2007, 17; Vårheim 2008, 3). This perspective also denotes the relationships among individuals, groups and/or organisations that create the capacity to act for mutual benefit. The theory is thus premised on the benefit an actor, individual or collective group can reap from those social relations and their embedded resources (Ali-Hassan 2009, 422; Oakleaf 2010, 81).

The concept of social capital has been popularised by various scholars, such as Pierre Bourdieu (1985), James Coleman (1988) and Robert Putnam (2000), and is applicable

to various disciplines such as sociology, education, economics, anthropology, business and political science. It has been applied to a wide range of social phenomena, where it is considered as an exclusive framework for analysing and understanding how and why multiple kinds of capital accumulate through the process of network development (Johnson 2015).

Conceptualisations of social capital theory in LIS research has been aligned to the work of Lin (2001), who views social capital as an individual resource. Lin's (2001, 1) theory of social capital is rooted in the concept of social network analysis, which provides methodological tools for investigating the relationships or ties between individuals. Consequently, as defined by Lin (2001, 12), social capital refers to "resources embedded in a social structure which are accessed and/or mobilised in purposive actions." Lin's (2001) idea of the theory of social capital explains how the quality of social resources, available to an individual within his or her social network, influences the success of achieving the desired outcomes or goals through an identified method of measurement (Lin and Dumin 1986, 365; Johnson 1995, 323). Lin's (1999, 2001) work has mainly focused on status attainment and how social capital affects access to better jobs and hence, higher societal standing in life.

Social Capital Theory and Academic Libraries

The concept of social capital and its potential as a framework in LIS research has been explored in the various dimensions of library services such as public libraries (Hart 2007; Vårheim 2008), information seeking (Johnson 2004; 2007; 2015), information literacy (Ferguson 2010), knowledge management (Adler and Kwon's 2002), ICT (Chen 2013; Williams 2012), academic library outreach services (Ramsey 2016; Rempel and Markland 2018) and so forth, all of which are relevant to the different aspects of LIS research and education.

Studies in social capital theory in academic libraries are premised on their value as part of institutional establishments, which strategically positions them to enhance the social capital of their students through their various services (Ramsey 2016, 328). According to Johnson (1995, 324), social capital theory and methods of social network analysis can be used effectively to understand the structural and relational dimensions of the information behaviour of users. In other words, because social capital as a resource, is embedded in the networks accessed by individuals for their benefit, a user's personal information source can be easily identified through his/her social relations. This possibility is attributed to the potential value of information that is inherent in human social relations. Consequently, understanding how social network structure affects a user's information-seeking behaviour can help identify deficiencies in their information skills (Ali Hassan 2009, 422; Johnson 2015).

The roles of academic libraries in IL instruction and fostering lifelong learning in the creation of social capital have also been explored by Ferguson (2010). As argued by Ferguson (2010, 2), by inculcating IL skills for lifelong learning, librarians are helping

to prepare citizens for a lifetime of civic participation, thereby enhancing the growth of social capital in their communities (Kranich 2001, 40). Similarly, a few studies (Chen 2013, 13; Williams 2012, 48) that examined issues of the digital divide and the adoption of ICT by individuals and communities, have confirmed the role of social networks in impacting individuals' acceptance of new information technologies and creating a bond among people who adopt new forms of technologies in ways that help them develop social capital that is beneficial to their communities.

Consequently, social capital theory can be viewed as a promising theoretical framework of analysis in addressing the challenges of at-risk students in HEIs. The prospect of its adoption as a theoretical framework for research by academic libraries, therefore, is dynamic and evolving, which can further be used to inform practical aspects of academic library and information services and to formulate policies that address identified challenges faced by at-risk students in the 4IR.

Social Capital Theory, Academic Libraries and the 4IR

In the 4IR, the world has begun to transition to a new phase of industrial development. The future and growth of academic libraries within HEIs and their response to the challenges faced by at-risk students, will therefore be defined by the changes and trends brought about by the digital shift in technological innovations (Frederick 2016, 9). In the remainder of this aspect of the paper, an analysis of the issues outlined is discussed in line with the research questions of the paper.

What is the nature of academic library services to at-risk students in HEIs?

As a service-oriented profession, active interest by the Library and Information Science (LIS) profession in reaching disadvantaged user groups has been longstanding and is the impetus for caring and compassionate librarianship (Gavigan and Kurtts 2010, 11). The purpose of such library services is to identify the specific nature of services that can be targeted at these groups in order to ensure equal access to information resources and limit the challenges of social and digital exclusion (Angell 2017). In HEIs, a lot of interest has been generated over the years in academic libraries on the more practical ways to reach disadvantaged students, particularly those at risk of failure or withdrawal (Mngomezulu and Ramrathan 2015, 117). This is because challenges faced by at-risk students constitute some of the critical areas of concern for HEIs with a far-reaching impact on students' academic well-being, as well as general institutional progress and development (Koball et al. 2011, 14; Murray et al. 2016, 631; Oakleaf 2010, 32).

There have been multidisciplinary support service models adopted as intervention by HEIs for at-risk students in the interest of their success (Mngomezulu 2014, 1, 2). Often, the role of academic libraries has been information literacy (IL) and cognate literacies' training; library and information service mentoring and tutoring; collaboration with faculties for enhanced students' experience; advancement with digital technologies for easy information access; and one-on-one information consultations that serve as

individually-focused tutorials (Agada 2001, 84). However, increasing societal inequality, diversity of students' demographics, lower throughput, continuous drop-out rates, and raging anger from students in HEIs, are an indication of the complex societal ills that students endure in their educational experiences (De Jager et al. 2018, 2). These dynamics of students' educational needs and the complex challenges that students encounter, create the necessity to acquire information and digital skills for innovative exploits in the 4IR and the knowledge economy. This situation also indicates the need for transformation and renewal of current library and information services with intervention programmes targeting the specific needs of at-risk students in HEIs (Mngomezulu and Ramathan 2015, 117, 118). Consequently, a more multidisciplinary concerted effort is needed that places academic libraries as providers of universal access to information and scholarly works in new and current media formats in order to support at-risk students (Ahmat and Hanipah 2018, 55). Based on their value in providing relevant information services in support of teaching, learning and research, academic libraries are pivotal to quality higher education by serving as a formidable support structure for at-risk students. Hence, as advocates of the 4IR, academic libraries will need to identify current challenges of at-risk students in the digital context and determine newer transformative programmes to help combat drop-out rates in HEIs.

What theoretical approach can be adopted to inform transformative interventions in library and information services for at-risk students in HEIs?

Transformative services in academic libraries in the 4IR require the development of new methods. Granted that most academic library services are aligned to their institutional policies and programmes, an understanding of the issues regarding challenges of at-risk students is likely to inform theoretical approaches to any targeted measure that proffer solutions. Firstly, the unique needs of at-risk students, particularly those relating to contextual factors that affect their academic performance, are of paramount concern to improving their learning outcomes. Definitions of the concept of at-risk students indicate that their attributed profile suggests a nexus of socioeconomic, cognitive and behavioural factors as predispositions to their failure. In this regard, Lin's (2001, 12) concept of social capital, which argues for a more individualistic approach, could be contextualised within the identified social capital of each student in order to enhance their learning outcomes and educational experience. Lin's (1999, 467) emphasis on social network analysis specifically provides a methodological tool for investigating the relationships or ties between individuals and their social contexts. The adoption of this theoretical approach will enable academic libraries to:

1. Identify contextual as well as institutional risk factors that affect the academic performance of at-risk students.
2. Create the necessary technological prerequisites for optimal learning in the 4IR.
3. Develop information resources and services that can be adapted to meet the unique needs of at-risk students in the 4IR.

As noted by De Jager et al. (2018, 2), the renewed focus on the imperative to increase student throughput, while improving teaching and learning outcomes by academic libraries, also calls for the need to advocate a shift from the student-as-problem perspective (the deficit model) to the student-as-agent perspective. The student-as-agent perspective has earlier been echoed in studies by Agada (2001), Kuh and Gonyea (2003) and by Godsell and Chikane (2016). Consequently, as argued by Godsell and Chikane (2016, 55), the required shift in policy is for HEIs to begin to articulate a new approach that seeks to develop the social capital of each student by building their confidence and ability to participate on an equal footing with their more privileged peers. Through Lin's (2001) social capital theory, academic libraries can also key into this approach and help promote individual and collective empowerment of at-risk students in the context of the 4IR.

What strategies can be adopted by academic libraries in the 4IR toward transforming existing services for at-risk students?

Transformative services in academic libraries require the development of a clear strategy and vision by which all stakeholders within the HEIs system can key into. Social capital theory has been used to explain the improved performance of diverse groups, particularly in studies relating to public library services and their role in mitigating social exclusion (Hart 2007, 14; Pateman 2003, 8). Academic libraries in their context are strategically situated to positively affect students' social capital. Strategies that can be adopted to transform services to at-risk students in the 4IR include:

1. Library outreach services: Ramsey (2016, 328) points out that a variety of outreach initiatives by academic libraries can help students develop their social networks. This can be done through mentorship, counselling, providing information about future career opportunities in their fields of study, and so forth. This will enable them to make better informed decisions and a determination to achieve educational and professional goals in ways that enhance their social capital.
2. Inculcating IL skills: The changing structure of digital information sources in the 4IR will be one of the determining factors for the nature of skills expertise required to navigate advanced technological tools (Butler-Adam 2018; Ferguson 2010, 2; Hanover Research 2020, 6). Students must have the skills required to implement, manage and work with the new 4IR technology individually and collaboratively. Through IL instruction, librarians can aim to accommodate students' diverse learning styles, interests and experiences, and design instructional programmes that facilitate the development of appropriate skills (Adonna and Bette 2004, 142). Within an online learning context too, the practice of embedded librarianship, which is beyond the traditional one-shot library instruction approach, has also been used to provide learning support services to students in collaboration with discipline faculty.

3. Compassionate librarianship: According to Ramsey (2016, 330), a number of students from disadvantaged socioeconomic or educational backgrounds, particularly first year students, are unaware of the institutional support systems available to them and this tends to undermine their academic performance. Librarians could thus encourage the documentation and provision of information on the socio-economic and academic backgrounds of at-risk students, so as to create an avenue of assistance where it is needed (Agada 2001, 85; Mngomezulu and Ramrathan 2015, 129). This will also increase students' sense of belonging and the development of shared social networks within which to share information. This practice is in line with the well-established value of the LIS profession that demands ensuring equal and democratic access to students, irrespective of their socio-economic status. In the 4IR, librarians should seek to be continuously prepared to create sustainable programmes that empower students in terms of knowledge and skills capabilities, especially by making them understand how new and emerging technologies work (Ahmat and Hanipah 2018, 62).

Conclusion and Recommendation

This paper explored the context of academic library services to at-risk students and the strategies that can be adopted to transform their services in the 4IR. The theoretical perspective presented, sought to provide insight on some of the critical components of intervention that could be adopted by academic libraries in addressing the challenges of at-risk students in the 4IR. From the literature reviewed, it is seen that few studies reveal evidence-based data that support the role of academic libraries in limiting student drop-out rates, particularly using the social capital theory (Ramsey 2016, 331). This further indicates the theory as an under-explored area that has the potential to provide valuable insights on the role of academic libraries in developing social capital within the emerging technological space.

Even though there are criticisms of the social capital theory, particularly its lack of a consistent method by which both individual and social capital can be measured empirically, Grootaert and Bastelaer (2002, 6), Woolcock (2001), and Lin's (2001) approach, which focuses on individual social capital, is applicable to LIS research. The main strength of Lin's perspective of social capital theory, according to Johnson (1995, 325), is its ability to provide a method for measuring social capital that can be assessed against information-seeking outcomes. Lin's (2001) conception of social capital theory has been aligned to other well-established models of LIS research, such as Chatman's information poverty (1996), Erdelez's (1997) information encountering, and Savolainen's (1995) Everyday Life Information Seeking (ELIS). While this paper has been able to provide a theoretical perspective on the value of social capital theory for transforming academic library services in the 4IR, the application of the theory in a way that is unique to the context of at-risk students and its effectiveness, will need to be tested in future empirical research.

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