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CHANGING LEADERSHIP BEHAVIOURS: A JOURNEY TOWARDS A DATA DRIVEN CULTURE

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CHANGING LEADERSHIP BEHAVIOURS: A JOURNEY TOWARDS A DATA DRIVEN CULTURE

Research in Progress

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Abstract

Student retention is important to all Higher Education Institutions. This has driven considerable research and focus, much of which concluded that each institution must define those factors by which it can identify student retention risk. These factors include student attendance, engagement, participation, academic performance, socio-economic background, etc. Once these factors are identified the institution then works to put some sort of proactive intervention programme in place to prevent the student moving from a retention risk to a retention statistic. Much of the research supports the move towards data driven decision making for each institution: use data to identify the retention risk early, make some sort of intervention with the student with a view to mitigating the risk. Unsurprisingly, the research has predominantly focused on the behaviour of the student and providing data to institutional leaders who then drive interventions aimed at altering the at risk student's behaviour. However, very little research has considered how this data is impacting on the leaders themselves. This move towards a data driven culture has a significant dependency on leaders making data driven decisions and thus their behaviour is also an important factor. This paper looks at the impact a move towards a data driven culture can have on leadership behaviour.

Keywords: Leadership, Behaviour, Student Retention, Data Driven.

1 Introduction

With falling budgets and more competition for enrolments, the financial pressures on Higher Education Institutions are increasing significantly (Webster and Showers, 2011). In general customer relationship management terms, research has shown that it is far more costly to attract a new customer than to retain an existing one (Gemme, 1997) with some suggesting that it can be as high as five to seven times more costly (Leigh and Marshall, 2001). When applying this concept to higher education, Ackerman and Schibrowsky (2007) using the *Lifetime Value of Customers* as their primary measure, found that an increase of 10% in retention rates would account for an increase of 22% in revenue and fees. Interestingly, while colleges have tended to focus more time on student recruitment, a focus on retention is actually far more cost effective (Astin, 1993; Fike and Fike, 2008; Pascarella and Terenzini, 1991; Tinto, 1993; Webster and Showers, 2011). For this reason, among others, retention has started to receive far more focus. Confirmation of this can be seen in the proliferation of student retention research. Interestingly, and understandably, there has been a strong leaning towards the perspective of the student in this research. Why does a student fail to persist? What are the factors which identify a student as a retention risk before he/she becomes a retention statistic? Some of the indicating factors include socio-economic background (Arnold and Pistilli, 2012; Thomas, 2002; Tinto, 2006), academic integration (Thomas, 2002; Woosley and Miller, 2009), LMS activity (Arnold and Pistilli, 2012; Boston et al., 2011; Smith

et al., 2012), academic achievement (Arnold and Pistilli, 2012; bin Mat et al., 2013; Picciano, 2012; Tinto, 2006) and attendance (Picciano, 2012). While each institution decides on those factors it feels are important in identifying student retention risk, one common trend is that all institutions lean heavily towards a data driven approach. Harvest, mine and collect the necessary data to allow better decision making around student retention risk. Identify the at-risk students and then intervene. Can we intervene in time so that we change their behaviours? But what about the impact on the decision makers? Have any of the retention studies considered the impact of data driven decision making on the behaviours of the leaders themselves? This research looks at the impact a student retention focused data driven approach has on leadership behaviour in an Irish Higher Education Institution.

2 A Review of Empirical Research into Student Retention

While a significant number of studies exist on student retention, Table 1 illustrates some of the main empirical studies only and provides some interesting insights. There is a strong propensity, understandably, to focus on the perspective of the student (Bean, 1980; Kuh et al., 2008; McKenzie and Schweitzer, 2001; Milem and Berger, 1997; Murtaugh et al., 1999; Pascarella and Terenzini, 1980). Studies are interested in testing hypotheses by either exploring or explaining the behaviour of the student. There are some examples (Thomas, 2002) of studies straying from this and instead looking at the perspective (behaviour) of the institution and how that impacts upon students. There is also a strong propensity, to rely heavily on data mining to collect data (Kuh et al., 2008; McKenzie and Schweitzer, 2001; Milem and Berger, 1997; Murtaugh et al., 1999; Pascarella and Terenzini, 1980). Some exclusively rely on this technique, while others use it as a technique to identify a sample set and then possibly use more qualitative techniques to collect data from that sample. Owing to the explanatory, quantitative nature of many of the studies (Bean, 1980; Kuh et al., 2008; McKenzie and Schweitzer, 2001; Milem and Berger, 1997; Murtaugh et al., 1999; Pascarella and Terenzini, 1980), there is a strong leaning towards quantitative analysis techniques to analyse the collected data.

What is not considered in any of this research is the impact on leadership behaviour. The research highlights factors to help predict student retention risk with a view to providing leaders with the necessary data to make proactive decisions. Student retention research has not looked at the impact this data driven approach has on the leaders themselves and their behaviour. This research explores that impact. Also, none of the research in Table 1 use interpretivist approaches. This research also explores that methodological gap using an exploratory design with qualitative data gathering and analysis methods.

Author	Research Objective	Research Design	Data Gathering Techniques	Data Analysis Techniques
Bean (1980)	To investigate the determinants of student attrition in institutions in higher education.	Explanatory experimental design using a quantitative technique to collect data.	Custom questionnaire developed with 1195 responses received.	Multiple regression analysis and path analysis
Pascarella and Terenzini (1980)	To examine the predictive validity of a measure constructed from academic and social integration.	Explanatory longitudinal design using quantitative and qualitative techniques to collect data	Data mining along with a questionnaire which received 1457 responses.	Multivariate Analysis of covariance and discriminant analysis
Milem and Berger (1997)	Further the understanding of Tinto's model of student departure by using behavioural measures based on Astin's theory of involvement.	Explanatory longitudinal design using quantitative and qualitative techniques to collect data.	Data mining along with a questionnaire which received 1343 responses.	Multivariate Analysis
Murtaugh et. Al (1999)	Develop a model to predict a student's probability of leaving school based on demographic and academic variables.	Exploratory longitudinal design using quantitative techniques to collect data.	Data mining	Survival (failure-time) analysis
McKenzie and Schweitzer (2001)	A prospective investigation of the academic, psychosocial, cognitive and demographic predictors of academic performance of first year Australian university students.	Exploratory case study design using quantitative techniques to collect data.	Data mining and Questionnaires	Regression analysis
Thomas (2002)	To provide a conceptual and empirical understanding of the ways in which the values and practices of a higher education institution impact on student retention.	Exploratory case study design using qualitative techniques to collect data.	Focus Groups, Questionnaires, Interviews	Some statistical analysis
(Kuh et al., 2008)	To determine the relationships between key student behaviours and the institutional practices and conditions that foster student success.	Exploratory Longitudinal design using quantitative techniques to collect data.	Data Mining	Statistical significance (probability testing). Evidence of Ordinary Least Squares and Logistic Regression.

Table 1. A review of empirical research into student retention.

2.1 Leadership Behaviour

To explore the impact on leadership behaviour, a mechanism for coding or observing leadership behaviour is required. From the middle of the 20th century and with the advent of the seminal OHIO State and Michigan studies, leadership behaviour saw a proliferation of research for the remaining half century. This focus, while fruitful, did lead to some significant inconsistencies emerging in the definition and categorisation of leadership behaviours. Yukl et al. (2002) recognised the problem this proliferation was creating and set out to create a conceptual framework of integrated leadership behaviours aimed at addressing the research gap due to lack of agreement about which behaviours were relevant and meaningful. Up to this point most research on leadership behaviour focused on two main meta-categories (*relations-oriented behaviour* and *task-oriented behaviour*). Yukl et al. posit that a third category had been overlooked (*change-oriented behaviour*). Their objective was to evaluate whether these three meta-categories provided the basis for developing an integrative taxonomy of leadership behaviour. Table 2 below illustrates the primary findings from Yukl et al. which concluded with a taxonomy of 12 main

leadership behaviours and also provides a brief description of each. This taxonomy of leadership behaviours is then used as a conceptual framework to explore the impact a data driven culture can have on leadership behaviour in the context of student retention.

Behaviour Type	Leadership Behaviour	Description
Task Oriented	Short-Term Planning	Determining how to use personnel and resources to accomplish a task efficiently, and determining how to schedule and coordinate unit activities efficiently.
	Monitoring Operations	Checking on the progress and quality of work, and evaluating individual and unit performance
	Clarifying Roles	Assigning tasks and explaining responsibilities, task objectives and performance expectations.
Relations Oriented	Supporting	Acting considerate, showing sympathy and support when someone is upset or anxious, and providing encouragement and support when there is a difficult, stressful task
	Developing	Providing coaching and advice, providing opportunities for skills development, and helping people learn how to develop their skills.
	Consulting	Checking with people before making decisions that affect them, encouraging participation in decision making, and using the ideas and suggestions of others.
	Recognizing	Providing praise and recognition for effective performance, significant achievements, special contributions, and performance improvements.
	Empowering	Allowing substantial responsibility and discretion in work activities, and trusting people to solve problems and make decisions without getting prior approval.
Change Oriented	External Monitoring	Analysing information about events, trends and changes in the external environment to identify threats and opportunities for the organizational unit.
	Encouraging Innovative Thinking	Challenging people to question their assumptions about the work and consider better ways to do it.
	Envisioning Change	Presenting an appealing description of desirable outcomes that can be achieved by the unit, describing a proposed change with great enthusiasm and conviction.
	Taking Risks for Change	Taking personal risks and making sacrifices to encourage and promote desirable change in the organization.

Table 2. Description of leadership behaviours (After Yukl et al. 2002).

3 The Research Approach

This study is building theory and exploratory in nature. In building theory, the researchers are exploring the impact data may have on leadership behaviour. A single case study design, using qualitative data collection and analysis techniques, is chosen with Cork Institute of Technology as the case.

3.1 Cork Institute of Technology

The association of this institute with education in Ireland can be traced back as far as the 1830s. Offering a range of flexible full-time and part-time higher education the institute delivers courses in art & design, business, engineering, humanities, music, maritime studies, and science & information technology. The participants in this research are the entire senior management team which is broken down by numbers and roles in Table 3 below.

Head of Department	Head of School	Head of Faculty	President / VP	Total # Leaders
46	7	2	4	59

Table 3. Research participant profile

Student retention is central to almost every programmatic review in this institution. As a result, many retention related questions tend to arise. Soon after joining the institution in 2013, the lead researcher recognised that while the institution had significant data stores and repositories it did not have a data driven culture. The lead researcher embarked on a programme to introduce a new data driven culture to the organisation exploiting its vast data assets. One of the elements to this programme was the introduction of a new enterprise reporting portal and associated reports and dashboards providing student retention data for the first time to all senior managers. This led to further programmes on data governance, data awareness and data quality all contributing to bringing a new culture of data into the organisation.

3.2 Data Gathering

The primary sources of data were interviews, participant observation and questionnaire as documented in Table 4. A total of 32 interviews were conducted across the 59 leaders. However, as the number of leaders in the group was significant it was not planned to interview all 59, but to engage a representative sample at various points in time. Therefore, the design also included participant observation and survey as data collection techniques to increase representation.

The interviews used in this research were predominantly structured. Early in the study, they were exploratory and would be best categorised as structured and open-ended. These initial interviews then led to the creation of a very focused and structured interview protocol and questionnaire protocol aimed at identifying the presence, or otherwise, of the 12 leadership behaviours listed in Table 2. Added to this, the researcher's observation notes were also structured around the 12 leadership behaviours.

	Interviews	Questionnaire	Observations
Design	Structured to identify presence, or otherwise, of the 12 leadership behaviours	Anonymous. Structured to identify presence, or otherwise, of the 12 leadership behaviours	Structured to identify presence, or otherwise, of the 12 leadership behaviours
Timing re data programme	Pre + During + Post	Pre + During + Post	Pre + During + Post
Media	Audio Recordings and subsequent transcriptions. 32 interviews and a total of 17-18 hours of recordings	Online Survey of all 59 leaders. 3 surveys with 75% - 82% participation.	Observations lead to informal discussions and subsequent note taking. Participants were aware of observations.

Table 4. Summary of data gathering process

Data Gathering Timeline

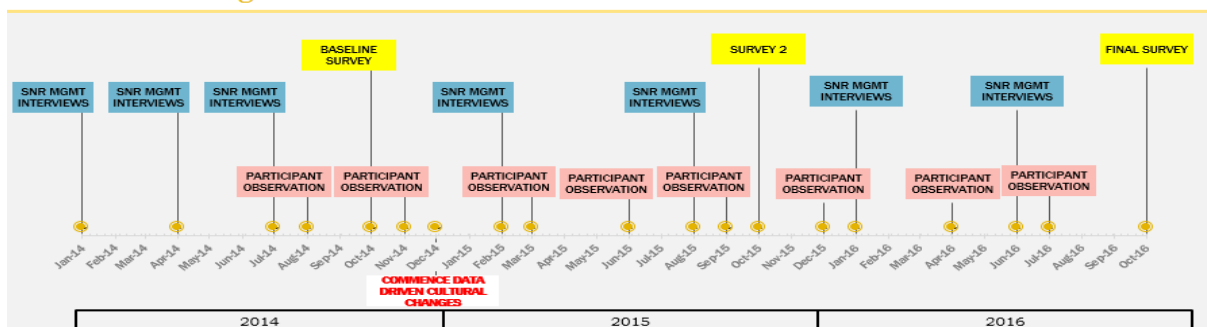


Figure 1. Data gathering timeline.

Figure 1 provides an illustration of the data gathering timeline. Data returned from the three primary sources were used for corroboration and triangulation. Interviews ran from early 2014 through until late 2016. Interviews were always 1-1. A total of 3 questionnaires were conducted with the same population;

a baseline in 2014, an interim in 2015 and a final questionnaire in 2016. As a member of the senior management team, the researcher also used participant observation as a data gathering technique from mid-2014 up to mid-2016 and all observations were documented using a personal notebook file structured around the 12 leadership behaviours.

3.3 Data Analysis

The primary analysis techniques used in this research include coding and comparison as a form of content analysis and thematic analysis.

Coding essentially indexes the data which makes storage and retrieval more productive (Thomas, 2010). The 12 leadership behaviours were used to code all questions in the interviews and questionnaire. This helped commence the analysis phase early as it allowed data to be analysed soon after it was collected. Similarly, observations were also coded against the 12 leadership behaviours. Transcribed interview data was coded in NVIVO, questionnaire data was pre-coded in Excel and observations were also coded in Excel. Data was visualised using PowerBI to assist the emergence of further trends and themes. This then allowed for comparisons and triangulations to be made across each of the data sources to confirm if particular behaviours could be observed as increasing or decreasing. The constant comparative method, created by Glaser and Strauss (1967), is generally recognised as the most effective means of content analysis (Lincoln, 1985; Mellon, 1990; Westbrook, 1994). However, coding can only be as good as the underlying data itself. This technique exposes itself to researcher bias (Bryman, 2012), and as only one of the researchers was involved in the coding and analysis this could be described as a limitation of the research.

Arising out of the comparisons made during the analysis of data, these comparisons were then used to identify any potential emerging themes. For example, were their particular behaviour types being observed that were related to additional data being available, or even themes such as behaviours evident in interviews and not in the questionnaire or observations or vice versa. Thematic analysis is a common approach to qualitative data analysis (Bryman, 2012). It involves the development of a framework or matrix to construct the central and sub-themes of the data (Bryman, 2012). The technique is flexible, non-complex, easy to learn, it can highlight differences and similarities and can also generate unanticipated insights (Bryman, 2012).

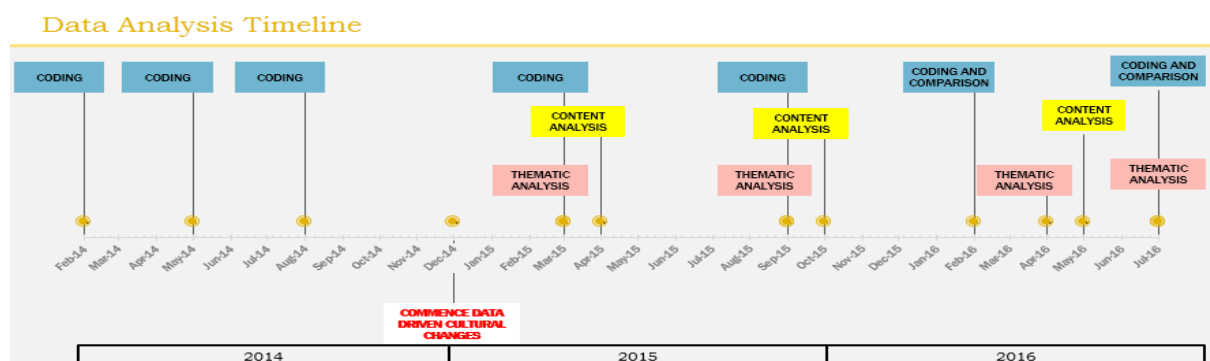


Figure 2. Data analysis timeline.

Figure 2 provides an illustration of the data analysis timeline. All survey questions were coded against one of the 12 leadership behaviours from Table 2 above. The results of the surveys were then compared to each other using these 12 coded behaviours. Interviews and meetings with the senior management team ran from 2014 through 2016 and the content of these interviews were analysed to understand if any of the 12 leadership behaviours were evident. This evidence was triangulated with survey results and participation observations. Survey results, interview transcripts and participant observations were analysed with a view to identifying any themes that emerged from the data.

4 Initial Findings and Discussion

Table 5 shows a summary breakdown of behavioural trends by data source. The survey results column shows a trend of behaviours across three surveys of the population: pre, during and post the move to a data driven culture. This data shows a distinct trend towards change oriented behaviour types after leaders have been provided with data insights as part of the move towards a data driven culture. This trend was corroborated in the analysis of participant observation and interview results. However, while the survey results showed leaders moving away from task and relations oriented behaviours, at the time of writing this paper, this could not be confirmed or otherwise in the other data as the full analysis of the participant observation and interview results was not yet complete. This is a limitation of this research at this time.

Behaviour Type	Leadership Behaviour	Survey Results	Participant Observation Results	Interview Results
Task Oriented	Short-Term Planning	↓	n/a	n/a
	Monitoring Operations	↓	n/a	n/a
	Clarifying Roles	↓	n/a	n/a
Relations Oriented	Supporting	↓	n/a	n/a
	Developing	↑	n/a	n/a
	Consulting	↓	n/a	n/a
	Recognizing	↓	n/a	n/a
	Empowering	↓	n/a	n/a
Change Oriented	External Monitoring	↑	↑	↑
	Encouraging Innovative Thinking	↓	↑	↑
	Envisioning Change	↑	↑	↑
	Taking Risks for Change	↑	↑	↑

Table 5. Initial findings.

The following section discusses in some detail why one of the primary initial findings is that leaders who are given access to substantial data sets trend towards change oriented behaviours.

4.1 Initial Findings

Initial expectations were that the leaders would begin to exhibit more of the leadership behaviours from the Yukl et al. taxonomy. However, once the initial survey results arrived it showed that many behaviours were starting to show an alarming decrease in use. This was initially quite worrying until it was noticed that there seemed to be a trend in that the change oriented behaviours were showing an increase with the relations and task behaviours showing the decrease. When this survey data was then compared to the interview and participant observation data a similar trend was observed. It became clear that the leaders began to exhibit a trend towards change oriented behaviours after receiving comprehensive data sets on student retention.

4.1.1 External Monitoring

Soon after the leaders were provided with their relevant data sets and dashboards, external monitoring behaviours could be observed in interviews and meetings. As soon as leaders were comfortable with the quality of data and felt they understood what it was telling them, some consistent next questions included

“how does my programme compare nationally”, “are my numbers consistent with those of my peers”, “but that is what the numbers are showing nationally so it is not just me”. The leaders interviewed wanted to know what the statistics for the relevant programme were nationally. If those figures were not available nationally then the next question tended to be *“how does my programme compare to our local peers”*. Whether to identify threats or opportunities, there was an observable strong leaning to monitoring the external environment.

4.1.2 Encouraging Innovative Thinking

In early 2016 one of the Heads of Faculty arranged a meeting with his senior staff. At this meeting heads of department and school were given the following messages: *“Now that you have the student retention related data for your department I will be asking each of you individually to come up with a response to what the data is telling you”*. The head of faculty challenged each member of his senior leadership team to question their assumptions about their departments approach to student retention in light of the data provided. In doing this the head of faculty also challenged each of his leadership team to consider better ways to deal with any issues highlighted. A natural inclination may have been to review the data and give a view on what should be done. However, this was evidence of the leader empowering his staff and also encouraging innovative thinking.

4.1.3 Envisioning Change

In early 2016 one of the Vice Presidents asked for assistance from the IT Department to facilitate a data quality exercise. Having reviewed the data, the VP felt that, as data owner, she had a data quality issue. After an initial meeting it was agreed that the researcher, as Head of the IT Department, would host and run a data quality exercise which would leverage Tom Redman’s ‘Friday Afternoon Measure’. At the workshop, which included all staff members involved in processing and consuming the relevant data, the Vice President in question articulated to her staff that she was unhappy with the quality of data that was owned, processed and consumed by her function. As a result of this data quality issue she felt that the quality of her decision making was compromised. She enthusiastically presented an appealing description of a desirable outcome that required commitment from her team members.

4.1.4 Taking Risks for Change

Taking lead from his Head of Faculty’s leadership above, one of the Heads of Department made a bold decision based on an issue his data was highlighting to him. A particular programme, delivered by his department, had far poorer retention statistics than all other programmes in the institution. The leader in question felt that this was *“because our programme delivery created student cohorts strongly linked to programmes, this programme was a self-fulfilling prophecy as everyone, students and staff included, now expected that this cohort was going to experience the largest retention issue”*. The leadership response was to drastically change how that programme was delivered and create blended cohorts rather than programme cohorts. This change had a drastic impact on staff who were quite unhappy and threatened industrial action. However, the leader, in the face of strong discontent from his staff, felt strongly enough to take personal risks and make sacrifices to encourage and promote change in the organization.

4.2 Limitations of the research

An immediate limitation to this research is that all case data gathered has not yet been analysed. While the positive trend towards change oriented behaviours found in the survey was confirmed in observations and interviews, the trend away from task and relations oriented behaviours found in survey results has not yet been triangulated. However, the research is proving very exciting and can make a contribution. To date all student retention models have focused primarily on student behaviour. It is hoped this research will produce a new student retention model which will focus on both student and leader behavioural constructs which will ultimately strengthen an institutions ability to manage student retention.

References

- Ackerman, R., Schibrowsky, J., 2007. A business marketing strategy applied to student retention: A higher education initiative. *J. Coll. Stud. Retent. Res. Theory Pract.* 9, 307–336.
- Arnold, K.E., Pistilli, M.D., 2012. Course signals at Purdue: using learning analytics to increase student success, in: *Proceedings of the 2nd International Conference on Learning Analytics and Knowledge*. ACM, pp. 267–270.
- Astin, A.W., 1993. *What matters in college?: Four critical years revisited*. Jossey-Bass San Francisco.
- Bean, J.P., 1980. Dropouts and turnover: The synthesis and test of a causal model of student attrition. *Res. High. Educ.* 12, 155–187.
- bin Mat, U., Buniyamin, N., Arsad, P.M., Kassim, R., 2013. An overview of using academic analytics to predict and improve students' achievement: A proposed proactive intelligent intervention, in: *Engineering Education (ICEED), 2013 IEEE 5th Conference on*. IEEE, pp. 126–130.
- Boston, W.E., Ice, P., Gibson, A.M., 2011. Comprehensive assessment of student retention in online learning environments. *Online J. Distance Learn. Adm.* 14.
- Bryman, A., 2012. *Social research methods*. Oxford university press.
- Fike, D.S., Fike, R., 2008. Predictors of First-Year Student Retention in the Community College. *Community Coll. Rev.* 36, 68–88.
- Gemme, E.M., 1997. Retaining customers in a managed care market. *Mark. Health Serv.* 17, 19.
- Glaser, B., Strauss, A.L., 1967. *Strauss (1967): The Discovery of Grounded Theory: Strategies for Qualitative Research*. Lond. Wiedenfeld Nicholson.
- Kuh, G.D., Cruce, T.M., Shoup, R., Kinzie, J., Gonyea, R.M., 2008. Unmasking the Effects of Student Engagement on First-Year College Grades and Persistence. *J. High. Educ.* 79, 540–563.
- Leigh, T.W., Marshall, G.W., 2001. Research priorities in sales strategy and performance. *J. Pers. Sell. Sales Manag.* 21, 83–93.
- Lincoln, Y.S., 1985. *Naturalistic inquiry*. Sage.
- McKenzie, K., Schweitzer, R., 2001. Who succeeds at university? Factors predicting academic performance in first year Australian university students. *High. Educ. Res. Dev.* 20, 21–33.
- Mellon, C.A., 1990. *Naturalistic inquiry for library science*.
- Milem, J.F., Berger, J.B., 1997. A modified model of college student persistence: Exploring the relationship between Astin's theory of involvement and Tinto's theory of student departure. *J. Coll. Stud. Dev.* 38, 387.
- Murtaugh, P.A., Burns, L.D., Schuster, J., 1999. Predicting the retention of university students. *Res. High. Educ.* 40, 355–371.
- Pascarella, E.T., Terenzini, P.T., 1980. Predicting freshman persistence and voluntary dropout decisions from a theoretical model. *J. High. Educ.* 60–75.
- Pascarella, Terenzini, 1991. *How college affects students: Findings and insights from twenty years of research*. Jossey-Bass, San Francisco.
- Picciano, A.G., 2012. The Evolution of Big Data and Learning Analytics in American Higher Education. *J. Asynchronous Learn. Netw.* 16, 9–20.

- Smith, V.C., Lange, A., Huston, D.R., 2012. Predictive Modeling to Forecast Student Outcomes and Drive Effective Interventions in Online Community College Courses. *J. Asynchronous Learn. Netw.* 16, 51–61.
- Thomas, G., 2010. *How to do your case study: A guide for students and researchers*. Sage.
- Thomas, L., 2002. Student retention in higher education: the role of institutional habitus. *J. Educ. Policy* 17, 423–442.
- Tinto, 1993. *Leaving college: Rethinking the causes of student attrition* (2nd ed.), 2nd ed. University of Chicago Press, Chicago.
- Tinto, V., 2006. Research and practice of student retention: what next? *J. Coll. Stud. Retent. Res. Theory Pract.* 8, 1–19.
- Webster, A.L., Showers, V.E., 2011. Measuring Predictors of Student Retention Rates. *Am. J. Econ. Bus. Adm.* 3, 296–306.
- Westbrook, L., 1994. Qualitative research methods: A review of major stages, data analysis techniques, and quality controls. *Libr. Inf. Sci. Res.* 16, 241–254.
- Woosley, S.A., Miller, A.L., 2009. Integration and institutional commitment as predictors of college student transition: Are third week indicators significant? *Coll. Stud. J.* 43, 1260.
- Yukl, G., Gordon, A., Taber, T., 2002. A hierarchical taxonomy of leadership behavior: Integrating a half century of behavior research. *J. Leadersh. Organ. Stud.* 9, 15–32.