Title: Systems change in UK HEIs:
How do culture, management, users and systems align?

ABSTRACT

Purpose - Assessing the implementation of integrated Information Systems in UK Higher Education Institutions via multiple internal stakeholders.

Design/methodology/approach – Analysing the implementation strategy of two HEIs and assessing the impact of new systems on working practices. This involves interviews with various stakeholder groups from the HEIs, capturing 35 interviews.

Findings – Growth of alternative power bases emerge within both HEIs, new roles and responsibilities for administrative staff emerge, with different academic working practices. Varying levels of importance are given to people and culture, management support, user involvement and clarity of communication and systems' requirements at project pre-implementation, implementation and post-implementation.

Practical implications – This study provides lessons HEIs planning to undertake significant change by implementing integrated Information Systems. Challenges emerge around fit, complexity, training, communication and consultation. Benefits gained and emerging challenges show some commonality between the two case HEIs, pointing the way forward for other "*large*" (student number determined) HEIs embarking on similar change.

Originality/value – The UK HEI sector is experiencing major change emphasising cost reduction and operational efficiency. Understanding challenges relating to significant systems change in complex settings with varying stakeholder demands has considerable sectoral value.

Keywords: *integrated information systems, people, communication, management support, system requirements, Higher Education.*

1. INTRODUCTION

Integrated information systems accompany crucial political and policy implications for organisations but may deliver unintended consequences through institutional and individual behaviours and perceptions (Dang *et al*., 2017). They potentially afford efficient and accurate record keeping, enhanced data handling and better resource deployment, enabling internal and external stakeholders to make informed decisions, and by capturing technical and organisational outcomes, yield appropriate benefit levels (Coombs, 2015). Various concerns have emerged during complex systems implementation. Roles and responsibilities may alter, with confusion and tension between stakeholder groups, who fail to understand the necessity of strategic change (Fowler and Gilfillan, 2003; Pollock and Williams, 2009; Lechtchinskaia *et al*., 2011; Scholtz *et al*., 2013; Bamel *et al*., 2014; Gunawardhana and Perera, 2015; Abugabah *et al*., 2015; Mourad, 2017). Systems change can alter operational methods, the implementation team needing to exert significant effort and influence on various user groups to co-exist and co-work effectively.

In Higher Education (HE), change reflects a competitive national and globalised market with technological advances playing a crucial infrastructural role. The sector has witnessed significant transformation post-millennium, Universities have transformed from institutions concerned only with developing knowledge to embracing language and behaviours of commercial organisations, assessed through highly competitive key performance indicators. Increased governance and accountability uplift operational complexity further complicating information technology maturity for institutions transitioning from their public sector setting (Jones *et al*., 2017; Simonofski *et al*., 2018).

Effective communication is challenging, exacerbated by diverse user requirements and objectives that compete and contradict (Dudau *et al*., 2018), impacting on day-to-day system requirements. Communication challenges heighten through an upward shift in deployment of integrated information systems, redefining academic roles and altering working conditions, increasing tension and uncertainty (Lewis *et al*., 2005; Abugabah *et al*., 2015). Despite huge associated financial investment, full systems potential is rarely achieved (Pollock and Williams, 2009; Abugabah *et al*., 2015; Garg *et al*., 2015). There are calls for research to gain better understanding of how implementation of integrated IS impacts on human resources in organisations (Spano *et al*., 2009), particularly the link between system quality and employee performance (Althonayan and Althonayan, 2017). This study evaluates the issues informing these implementations and the impact on various stakeholder groups. Crucial to assessment is organisational complexity, institutional context and challenges of implementation at various project stages. These areas define the literature review, research findings and

discussion. System implementation in HE and the challenges associated represent crucial study contributions, providing insights into organisational implications that implementations have on HEIs, focussing on the inter-linking roles of the various role participants.

2. Literature Review

2.1. UK HE sector change

A significant number of organisations are either publicly funded or privately owned. Commonality covers structure, function and operations, although income-generating and governance remain distinct. Public organisations are publicly funded, owned and controlled and are subject to associated responsibility and accountability. Private companies are privately owned and funded, operating subject to markets, with aligned risk and accountability (Baarspul and Wilderom, 2011). Many public organisations are transitioning towards private sector managerial practices. Common public sector challenges include co-ordinating resources, controlling costs, developing an enterprise culture, alongside maintaining intra-employee collaboration. Transitioning adds to the complexity of public organisation management, with increasing and changing stakeholder pressures (Piening, 2013; Jones *et al*., 2017). For Universities, there is perception of uniqueness centred on education and knowledge creation as primary functions (Shoham and Perry, 2009; Bulchand-Gidumal and Melian-Gonzalez, 2010), social interaction dominating, affording an organisational environment distinct from the simplistic public versus private dichotomy. However, universities arguably face similar issues to other modern organisations (Abugabah and Sanzogni, 2010). UK HEIs have witnessed cuts in UK Government funding. This has forced further migration to private sector practices, with greater attention to developing new income sources, and internally, achieving efficiencies and savings. It is posited that Higher Education represents a transitioning public service, the student role being transformed from user to consumer bringing consumer expectations commonly associated with market-oriented service providers (McCulloch, 2009). The trajectory is further complicated by numerous stakeholders involved in HE services' design and delivery holding contradictory priorities with pressure points relating to "*professionals*" and "*consumers*" (Dudau *et al*., 2018).

A part response to these changes involves HEIs recalibrating their internal systems through integration, becoming efficient and more effective in responding to multiple stakeholder expectations. It is vital to understand how management of information through effective IS can help Universities achieve smoother

collaboration amongst its different groupings and enhance associated decision making. There is recognition that HEI stakeholders are complex and multifaceted, further layering complexity to any integrated IS response (Bamel *et al*., 2014; Gunawardhana and Perera, 2015; Mourad, 2017). The research motivation here is understanding the role-related experiences of HEI stakeholders and the impact through involvement and inter-group relationships on integrated IS implementation. There is recognition that achieving full potential from such interventions is challenging, including the extent of achieving sectoral competitive advantage (Sabau *et al*., 2009), the necessity of technology fit, and from it, quality information (Abugabah *et al*., 2015) and ensuring the organisation informs the systems rather than vice-versa (Skoumpopoulou and Waring, 2017).

2.2. Integrated IS implementation in HEIs

Given the trajectory in organisational form subject to changing internal and external demands, the resultant organisational complexity and extension to performance measures mean success factors associated with IS implementation may differ from organisations purely publicly or privately oriented. The four following criteria are critical for success and improved performance associated with effective IS change; people and culture, management and organisational support, user involvement and clear communication channels and system characteristics/requirements (Bulchand-Gidumal and Melian-Gonzalez, 2010; Aldayel *et al*., 2011; Bamel *et al*., 2014; Garg *et al*., 2015; Skoumpopoulou and Waring, 2017). Figure 1 represents the proposed framework for this research. This research will explore how these factors are perceived (through importance exhibited) during systems adoption at pre-implementation, implementation and post-implementation.

[Figure 1 goes here]

2.2.1. People and culture

There have been significant changes to HEIs' roles impacting on the contribution made by their academic staff, the external change drivers playing a greater role compared with change initiated in private sector organisations (Shoham and Perry, 2009). From a managerial perspective, HEIs are capturing both public and private-oriented practices, in response to changing expectations in governance and reporting. Lechtchinskaia *et al*. (2011) suggest organisational structures that are decentralised with diffused power distribution, as is the norm for HEIs where institutional authority is limited (Kuo, 2009), then project management which is inherently centralised will face particular challenges, relatively unwitnessed within the private sector. This is experienced by Miller *et al*. (2014), who report on an absence of co-creation between stakeholder groups in business model development, instead relying on transition, each step being recalibrated by

the needs and wishes of specific groups. Shoham and Perry (2009) recognise further private-public differences, with process and responding to the unplanned informing the former and substance/content and planning directing the latter. HEIs typically capture various disciplines, subjects bringing their own characteristics with appropriate and distinctive departmental-centred structures, reinforcing the decentralised approach to organisational structuring.

As two key stakeholder sets, academics and administrators have different perspectives and perceptions of each other regarding work-related issues and solutions, these straddling technological and economic challenges, decision making, teaching and research expectations and conflict resolution (Kuo, 2009). Working together to deliver strategic change is challenging, although contribution to decision-making, communication clarity on associated responsibility linked properly to reward can limit inter-stakeholder friction (Florenthal and Tolstikov-Mast, 2012) This can be helped by understanding differences in organisation-related fulfilment, belonging and bearing between the groupings and respecting this through role definition, deployment and involvement (Pelletier *et al*., 2015).

2.2.2. User involvement and the need for clear communication channels

Gemmell and Pagano (2003) witnessed diminution in collaboration and teamwork in post-implementation assessment of information system development and roll-out at a UK University. The primary rationale for change was enhancement to student information management throughout all key stages of the University journey from recruitment to graduation and first destination. Strong cross-organisational dissatisfaction occurred spanning various stakeholder groups, with reluctance to adopt. This accords with the steer from Ahmed *at al*. (2018) about the need for shared user understanding and the dangers in diverging user expectations. Gemmell and Pagano (2003) discovered various key barriers to system's success. Alongside the absence of stakeholder engagement was reluctance to provide information needs, provision of inaccurate system information on going live and unclear communication channels regarding system application, role and importance. The importance of changes in both institutional and individual behaviour impacting negatively on internal collaboration and teamwork cannot be underestimated, therefore requiring supported stakeholder involvement (Coombs, 2015; Fryling, 2015). The implementation of a successful integrated information system can deliver benefits within HEIs. Such systems prove beneficial where there is increased expectation to demonstrate improved responsiveness to external businesses and wider society, both gaining importance as University stakeholders. If HEIs can integrate processes effectively and achieve across-the-board internal stakeholder buy-in, they can effectively and efficiently interact with numerous stakeholder groups (Pollock and

Williams, 2009; Bamel *et al*., 2014).

2.2.3. Management and organisational support

Management and organisational support are significantly cited as essential in success and effectiveness of integrated IS implementation, especially involving multiple intra-organisation perspectives (Dwivedi *et al*., 2015), with effective management in the education context being prepared for complexity and acceptance that change is manageable but challenging (Bytheway, 2017). This accords with Ranjan *et al*. (2016) who recognise that change and knowledge management provide dual consideration. There have been attempts to provide support guidelines for HEIs to navigate system change through organisational complexity. Fowler and Gilfillan (2003) posited a framework to assist institutions in developing and implementing large, multi-faceted information systems. This involved general guidance and proposed this as a bridge for cooperation between various key stakeholder groups. Within their stakeholder definition, there was inclusion of senior University management who offer strategic leadership and management of employee resistance (Le, 2016), the project team and system vendors, which as a stakeholder set, accords with the breadth reported by Watchaton and Krairit (2019). Oddly, Fowler and Gilfillan (2003) omitted two critical groups, academics and administrators, both being crucial to the successful operation of a University. Woo (2007) highlighted the importance of management and organisational support by discussing that integrated IS represent more than just technological change, an extension identified by Coombs (2015), and therefore management must take responsibility for implementation and lead change throughout, respecting project orientation differs by stage for both management engagement and scope (Ahmed *at al*., 2018). Woo's case study signposts the lack of clear communication with employees, insufficient direction, vision and a project champion underpinning problematic systems' implementation. There is further appreciation that organisational structure capturing stakeholder roles (Blumberg *et al*., 2019) and manager experience and learning (Khalid *et al*., 2018) can enhance success in implementing complex technologies, making management support an essential factor to explore in the HE context, where direction is paramount for employees who perceive role uniqueness and exhibit resistance to change.

2.2.4. System characteristics/requirements

Aldayel *et al*. (2011) identified ten main critical success factors (CSFs) for successful implementation of an integrated IS in a University with project management, system requirement and department/stakeholder participation being most critical. Aligning with this, aspects such as information requirement and associated

flow, supported appropriately through relevant tools and technology, with skill development and stakeholder predisposition represent essential factors for successful implementations in HEIs (Wazed Ali, 2011). It is reported that organisations lack internal expertise to support the implementation of complex systems leading to resistance and system dissatisfaction. Marler and Liang (2012) found implementation of integrated IS change employees' skills mix while users must develop new analytical skills that align with technology changes. This is supported by Garg *et al*. (2015) who found that HEIs fail to capitalise on advantages offered by integrated IS. This is predominantly due to technical expertise absence, the shortage of trained staff on complex IS means project team members cannot understand system characteristics and requirements, and consequently lack competence in utilising the systems, thereby not achieving maximum capability. From the perspective of benefits realisation, Coombs (2015) reports on relatively stronger achievement for data relevance and reliability, but less so on end-user perceived consistent reporting and information capturing.

2.3. Implementation stages of integrated systems in HEIs

Project execution comprises activity areas influenced in varying ways by the critical success factors considered above. These areas have varying impact at different project stages, labelled below as systems' pre-implementation, implementation and post-implementation, referred also as key project phases (Althonayan and Althonayan, 2017).

2.3.1. Pre-implementation

HEIs operate multiple and voluminous systems that are challenging to manage, with many having reached maturity in their development and deployment. In assessing deployment success, researchers suggest that Universities should allocate more time and resources to system pre-planning as a precursor for potential success, urging HEIs to ensure participation and active involvement from top management, alongside constant intervention from the planning team. Pre-planning must consider both enablers and barriers to successful systems' implementation capturing technical considerations and organisational needs to achieve post-implementation benefits (Coombs, 2015). Senior management has a crucial role in responding to and managing employee resistance and assessing these challenges from multiple perspectives (Le, 2016), their project engagement and sphere of influence differing between strategic input and setting of responsibilities as two key contributions (Ahmed *et al*., 2018). Future proofing technology selection, with consideration given to project, time, complexity and cost, is essential (Ranjan *et al*., 2016). A pre-defined necessity for systems to support decision processes and offer highly accurate information to HEIs is reported by Gorgan (2015), but shortfall is evident within HEIs around resultant analytical capability to effectively report on various aspects of their

student population, hence a missed opportunity at pre-implementation to fully scope out necessary system (technical) requirements and therefore missing the chance of exceeding in delivery on essential targets covering timing, cost and specification (Coombs, 2015).

2.3.2. Implementation

The role of people and culture on successful systems implementation within HEIs captures necessary multiple stakeholder involvement and a culture embracing openness to change, with necessary interventions from organisational management and system end-users (Watchaton and Krairit, 2019), with senior management extending their organisational scope to seek "*harmony*" across multiple employee groups (Ahmed *et al*., 2018). Crucial stakeholder involvement within HEI change projects involves notable examples of inclusion and exclusion. Fowler and Gilfillan (2003), in framing necessary stakeholder integration, omitted both academics and administrators, arguably the two most important operational contributors. Okunoye *et al*. (2008) highlight this shortcoming with consideration to ERP implementation specific to HEIs, stressing the importance of managers prioritising end-user needs and the benefits of active multi-stakeholder involvement to realise successful systems implementation. Culture and organisational configuration are recognised by Noaman and Ahmed (2015), who suggested that integrated IS should be tailored specifically to address organisational strategy, reporting structure and relevant institutional functionalities, recognising sectoral distinctiveness, with cross-organisational inconsistency in adoption being a barrier to successful realisation of project benefit, and further employee resistance to move to revised working practices (Coombs, 2015). The latter is crucial for HEIs, given relative role uniqueness for key stakeholder groups. The extent to which any system represents a means to an end is questioned by Sabau *et al*. (2009) who suggests integrated IS do not necessarily in isolation afford competitive advantage. In seeking to achieve this, HEIs should focus on service type and quality made available to its clients, specifically students, with IS playing the facilitator role rather than process driver. Sabau *et al*. (2009) further posit that communicating with and involving systems end users crucially differentiates between success and failure.

2.3.3. Post-implementation

HEIs and their stakeholders must appreciate that technological interventions potentially represent a "*paradigm shif*t" in institutional operations. Many institutions fail to seriously consider change consequences, leading to dissatisfaction and resistance, potentially manifesting themselves post-implementation. This reinforces the need for persuasion with significant levels of senior management intervention (Ahmed *et al*.,

2018) and a commitment to knowledge integration from senior management post-implementation with absence of such support a key determinant of project failure and subsequent financial loss (Ghazali *et al*., 2019). The criteria for project success may not align to higher strategic aspirations and therefore must extend beyond a baseline that captures system composition, delivery time and respect for budget (Coombs, 2015). Failure to deliver on expected benefits will be problematic, post-implementation. In their UK study, Gemmell and Pagano (2003) discuss how poor communication relating to benefits and system rationale, coupled with lack of system accuracy and ease of use affecting end-user trust lead to resistance and negativity, with recommendation that user skill assessment was crucial to support such stakeholders. Accuracy and accessibility represent potentially prolonged challenges, leading to high demand for system maintenance (Fryling, 2015), and with it, a run on project cost. Recognition is given here to time and resource afforded to corrective and adaptive maintenance, at the expense of delivering a system fully meeting stakeholders' expectations.

3. DATA AND METHODS

3.1. Case Organisation Selection

Case organisations, HEI A and HEI B, were chosen since both implemented identical integrated student administration systems (ISAS). Representatives from each were selected as interviewees to assess the implementation process, provide perception of its institutional impact, with similarity of system permitting cross-comparison.

HEI A employs over 900 staff servicing nine schools. It supports academic, financial and pastoral student support systems. Its degree programme offering is significant, supporting over UK-based 30,000 students and 3500 located overseas. As student numbers increased from the 1990s, its technology and IS needs changed accordingly. To satisfy students and growing information demands, there was internal desire to migrate to more contemporary information systems. Prior to ISAS implementation, HEI A employed numerous separate information systems, integration representing a primary change objective. Integration absence and limited intra-system communication exacerbated manual task execution, with administrators having to prepare reports separately. Data duplication prevailed with challenges around generating management information.

Case HEI B has over 15,000 UG and PG students located across four faculties. This HEI made substantial investments to ensure learners receive high-quality education and student experience. They also deliver programmes abroad. It has led on initiatives to support learning and teaching, pioneering approaches to

delivering off-campus support services and are consciously moving towards a "*hybrid university*" model. As the need to implement new student records system intensified, the key elements of the proposed ISAS were a new student administration system, technology to provide access for web-based learning, web-based student support systems and marketing/market research systems. The chosen system was UK manufactured and supported, with assumption of better fit for a UK HEI. The initial plan was to produce various robust and effective automated systems. The implementation team believed that new system introduction would provide a "*test-bed*" for other institutions with intention to design a toolkit for sectoral transferability.

3.2. Data Collection

The collection of qualitative data involved interviews, being compatible with building significant understanding of implementing integrated information systems from the perspective of key stakeholders. Interviews permit rich, textual data collection. There were further opportunities to return to participants for clarifications and follow-up.

The literature relating to integrated Information Systems is significant and multi-faceted, so a pilot study enabled better understanding of the most pertinent areas of assessment and thereby providing a better position to contextualise the key themes emerging from the literature. The authors piloted the questions initially with a Principal Administrator from each HEI, representatives who were actively involved throughout the systems change projects. The authors became familiar with the respective systems, gaining access to information regarding actively involved employees, who represented the most appropriate potential interviewees. The Principal Administrators provided various user manuals to facilitate system familiarity, whilst the pilot exercise they engaged in ensured that the questions used in the semi-structured interviews were relevant and could yield detailed narrative responses.

The primary research comprised 35 semi-structured interviews, 22 interviews from HEI A and 13 interviews fromo HEI B. Table 1 presents participants by HEI and role. Interviewee selection required change involvement pre-implementation, implementation and post-implementation, alongside familiarity with outgoing systems. The choice of participants involved representation from most Schools/Faculties within both HEIs. Two case organisations capturing perspectives of 35 stakeholders is perhaps a relatively small number of interviews. In terms of credible numbers and steer from the research methods literature, Easterby-Smith *et al*. (2002) argue that qualitative research can benefit from small interview numbers, with purposive participant selection. Guest *et al*. (2006) indicate data saturation occurred within the first twelve interviews, with basic meta-themes becoming apparent in the first six interviews. Other advice varies in terms of numbers, with Creswell (1998)

recommending between five and twenty five interviews, context dependent.

There is justification in claiming data depth and richness, the number of interviews terminated at the point at which themes started to reappear. Whilst generalisability is not achievable from two case studies representing an HE sector comprising more than 160 institutions, its equivalent within qualitative research encompasses the extent of findings' transferability, with further attention beyond this extension to the wider context capturing generalisation of theory, applicability of accompanying empirics and value to practice (Ihantola and Kihn, 2011), the latter chiming with aspirations of transferability of learning and experience put forward by one of the case organisations. Tracy (2010) highlights the necessity for "*resonance*" where research contribution moves its potential recipients by means of "*naturalistic generalizations*" and "*transferable findings*". The latter involves findings alignment with reader experiences. Multi-stakeholder perception of systems' implementation within large and complex HEI provisions has the potential to achieve this within other HEIs of comparable size, provision and operational complexity.

[Table 1 goes here]

3.3. Data analysis

Interview coding followed data-steered theoretical concepts, an approach consistent with the inductive philosophy adopted (King 2004). The approach to data structuring and analysis, undertaken by means of a manual template analysis, involved developing initial categories, grouping data according to these categories, identifying patterns and making comparisons across records to uncover shared elements and properties. The authors summarised the main themes that appeared in each interview, according to the four main areas highlighted in Figure 1. After determining the top-level data themes, relevant sub-themes emerged that provided specific information. The authors returned the transcripts to each interviewee to ensure accurate interview transcription, alongside confirming permission for transcript use. Post initial template development, validation was sought from two academics who read the transcripts and assessed the templates for understanding and accuracy.

4. STUDY FINDINGS

4.1. Pre-implementation

People and Culture: IS success is dependent upon the prevailing HEI culture and staff predisposition to technological change, which is true for the case participants. There was relative exclusion of academics in both

HEIs pre-implementation, project teams being administrator dominated (Academics, A and B). This dominance straddled system development and implementation, membership of the development teams and accessibility as the systems migrated to post-implementation. HEI B adopted a different approach to access rights compared with HEI A, where academics had no systems access. There is confusion with who '*owns*' the system and staff group(s) determining protocols.

User Involvement and Clear Communication Channels: Consensus in HEI A was that whilst proposed ISAS implementation was widely '*communicated*' via employee meetings, resultant information was limited. One administrator indicated: *"nobody informed us about the new system and there were no requests coming around asking if anybody wanted to be involved in user groups"* (HEI A). Academics from both point to a consultation deficit. The ISAS project management team from both HEIs claimed academics were defensive and demonstrated insufficient interest in the proposed systems, e.g.: *"we sufficiently informed people that a new system was coming in, but the executives and academic staff were not interested in the project"* (Project Management Team, A).

Management/Organisational Support: Some positive systems reception emerged across the various stakeholder groups for both Universities, an administrator indicating: *"although for the first two years, the implementation actually took over our lives, it helped us to think about things in different ways and to enhance our processes"* (HEI A). This perception reflected that business processes supported by outgoing systems were different from those captured by their successor, staff from various roles needing to adjust over time, a shortcoming emerging from absence of business process review pre-implementation. In HEI B, there was application of a detailed plan at implementation outset, developed by administrators, but with some academic input at senior management level (Senior Management, B). A Steering Committee was responsible for systems implementation at each stage, comprising individual staff members involved to either lead or actively support parts of the project.

4.2. Implementation

People and Culture: Certain tensions between various stakeholders became apparent with debatable communication relating to project implementation. This signals declining working relationships with departure from collegiality which should be core to change. Organisational culture can determine how internal stakeholders will deal with "*crises"*. Both case institutions experienced crisis periods during systems implementation, resulting in heightening employee tension, especially between academics and non-academics, determining relationships moving from professional, coherent and inter-dependent to those with differentiated or fragmented characteristics (HEI A and B). Because academics perceived that administrative staff were not

familiar with the new systems, inter-group trust was compromised, the former keeping their own records to ensure data accuracy, with prolonged trust absence and fear of data integrity post-implementation (Academics, A).

User Involvement and Clear Communication Channels: Academics were neither involved nor consulted during adoption and implementation and the administrators involved were limited in number and concentrated around "*selected principal administrators, who operate at a managerial level"* (Professional Support Staff, B). An academic suggests: *"there were a few e-mails telling us generally about the project, but this did not help us when the system went live"* (HEI B). Certain academics recalled difficulty for new colleagues through uncertainty around tasks and responsibilities, whilst for established employees it represented a stressful time-period because of working routine disorganisation. It is apparent that communication across both institutions was poor, with limited information cascading to most employees regarding systems implementation. Academics (A and B) alluded to their distancing from the new system by the decision-makers, providing opportunity for administraotrs to take systems' control, which had historically been run by academics for academic purposes.

Management/Organisational Support: The message across both HEIs was that University leadership considered the projects' purpose as delivering a system being administratively focussed. This points to a deliberately limited involvement for academics and to a primary objective being system introduction with greater managerial power and control. This assertion was supported by advertising systems implementation roles internally to exclusively administrative staff, appointments coming as secondment opportunities (Professional Support Staff, B). In HEI A, the project management team arranged for administrative staff systems training, employing ISAS consultants in tandem. This afforded numerous non-academic staff promotions based on project involvement, creating tension and dissatisfaction across the broader employee grouping. The project management team in HEA A issued email messages indicating successful system implementation. The contrasting feedback from individual departments, reported here resonates with academic stakeholders, yielding responses from the implementation team including "*you are the only ones with this problem, so it must be a department problem, and not related to ISAS"* (Professional Support Staff, A).

4.3. Post-implementation

People and Culture: One academic suggested that HEI A is an extremely bureaucratic institution, bureaucracy existing pre-implementation, the change process representing a missed opportunity for cultural improvement, with intimation that bureaucracy intensified. The interviews suggest that colleagues have focused on implementing the new system without considering its human-system interface (HEI A and B). Even for post-

implementation involving significant organisational change, many employees still employ paper-based processes for everyday activities. Within HEI B, programme boards remain paper-based, despite a major objective being to increase electronic information sharing and minimising errors, data mismatches and paper handling. *"I was amazed at the amount of paper that each member of the board had, we had big thick wedges of paper about an inch high and this was purely a print-out from the ISAS system"* (Professional Support Staff, B). Consensus emerged that the early weeks of implementation "*were a mess*", resulting in intense and stressful work atmospheres (HEI A and B). Myths and stories persisted about the competency of academics versus administrators regarding data entry onto the system, one non-academic suggesting: *"… academics do not have access to ISAS. Now, administrators have more control to ensure everything gets into the system on time and can have the control to ensure that everything is entered correctly"* (HEI A*)*. It is evident that administrators hold power, controlling and making decisions about data entry, setting dates for associated events thereafter. It is apparent that trust is absent between different stakeholder groups leading to a blame culture accentuated by pressure points in the academic year, coinciding with more problematic ISAS operations. In HEA B, an academic suggests that culture in Universities is changing and *"administrators became the holders of the rules and they were vested with power that basically anything that hits regulations or student numbers has to go through their hands"* (HEI B).

User Involvement and the need for clear communication channels: Various academics interviewed were mystified about the control culture around ISAS, believing all employees must conform to consistent protocols (HEI A and B). They appear not to understand why administrators are perhaps "*territorial*" regarding ISAS use, e.g. *"Not all tutors have access to ISAS and they also do not have training in ISAS"* (HEI B). Whilst one academic reported that *"they said that the academics don't need access to ISAS … queries need to go to the academic support"* (HEI B), another suggested *"it's like a handbag … it's like your worst worry… you mark your work; you've returned the work to the students and you don't have a copy of the mark 'oh my God'!"* (HEI B). Many academics retain Excel files out of fear of lost data, believing their own systems are safer than ISAS.

Management/organisational Support: There was an initial assumption that the resultant system would improve institutional life, however significant time post-implementation was needed for positive changes to be realised. One Project Leader admitted that implementation was rushed, stating: *"for the first two years it actually took over my life but it has made me think things in different ways and think how we can best do things with ISAS to enhance the university … we are still doing that … because it was a very quick implementation …"* (Project Manager, HEI A).

Systems Characteristics/Requirements: A major issue emerging post-implementation was insufficient levels of training for employees leading to reduced confidence in system application. It seems that when systems went live, various employees remember an emotional and stressful period, one indicating: *"It was terrible … I was really anxious because we really had insufficient training, we were thrown in there, get on with it, do your best and everybody kind of muddling really guessing!"* (Professional Support Staff, HEI A). Training in HEI B seemed more effective, being devolved to senior administrators to train colleagues, with subsequent cascading (Professional Support Staff, HEI B), unlike the modest activities in HEI A. This meant that administrators in HEI B were more confident in their new system since they could always receive immediate help and support. However, there was limited across-the-board training, with provision quality being somewhat variable. A major issue emanating from system implementation was new technology fit with existing University processes. Rather than institution/users dictating how they wanted the system to support their operations, the different departments/schools had to adapt processes to the requirements of the new system (Academics, A and B). End user perception was poor, typically taking employees significant time to adapt, post-implementation.

5. DISCUSSION

5.1. People and culture

IS implementation must embrace both technical and cultural aspects of change in tandem (Lechtchinskaia *et al*., 2011; Scholtz *et al*., 2013; Coombs, 2015; Skoumpopoulou and Waring, 2017). For HEI A, implementation teams gave more importance to system preparation for technical readiness at the expense of employee relationships and responsibilities. Employees across academic and non-academic groupings were frustrated, leading to negative behaviours including inter-role aggression. There was visible tension during system implementation making employees acceptance resistant, through lack of training and application understanding. Effective systems implementation requires comprehensive training and staff development "*packages*". Comprehensive resourced training programmes can add significant value to systems implementation, recognise employee needs where systems access is regular, involving routine activities alongside those where access is ad-hoc with sophisticated requirements (Abugabah and Sanzogni, 2010). For both HEIs, training was nowhere near extensive, although HEI B permitted training to be cascaded organisation-wide. HEI A interviewees suggest lack of training cascading detrimentally effected systems acceptance in the early "*live*" months, deterring causal/seasonal system users or those wishing to pursue higher-level analysis. The need to manage employee expectations and manage pre-implementation resistance is paramount (Le, 2016), so

collective inclusion is realised without curtailing user initiative.

Significant IS implementation represents a cultural shift and different user sets must realise that system implementation does not simply involve employee co-mingling. There must but be appreciation of respective re-aligned roles between academics and professional support, underpinned by meaningful integration of key stakeholder cultures and contributions, sustaining professional and beneficial co-relationships, to avoid drift towards the differentiated or fragmented (Ho, 2007). In both HEIs, avoidable lack of consideration of unique academic cultures was evident resulting in prolonged tension between academics and administrators. Absence of substantial academic involvement led to developing more managerial cultures with tangible rewards for administrative interventions in systems dedicated roles (Fowler and Gilfillan, 2003; Gemmell and Pagano, 2003; Gorgan, 2015). This cultural shift is characterised by greater adherence to rules and systems requirements at the expense of innovation. For knowledge-creating organisations, this can lead to disengagement of key groups, here, academics. This represents a significant lesson for HEIs, inclusivity from the outset being vital, but also necessitating change in organisations comprising stakeholders afforded higher levels of professional autonomy (Kuo, 2009). This is counter-balanced by changing roles for non-academics, reinforced by enhanced identity and reward (Florenthal and Tolstikov-Mast, 2012; Pelletier *et al*., 2015).

5.2. Management/Organisational Support

Senior management must demonstrate empathy towards employees to reciprocate loyalty and trust, thereby sustaining professional and coherent relationships (Ho, 2007; Woo, 2007). It is essential for organisational leadership to demonstrate honesty about change to gain essential employee support. Disengagement and distance demonstrated by organisational leaders encourages similar employee behaviours (Woo, 2007; Skoumpopoulou and Waring, 2017). The involvement and support of top management was found to be critical, highlighting unique HEI culture and characteristics, these being side-lined in integrated information systems implementation here, For both HEIs, top management support and commitment was weak, echoing the findings of Coombs (2015), causing tension between various stakeholders leading to blame and shifting of responsibilities in response to system's shortcomings (Le, 2016), evidence at the three identified stages of the implementation projects (Althonayan and Althonayan, 2017).

5.3. User involvement and clear communication channels

Building trust is time dependent and compromised much more easily than developed (Bamel *et al*., 2014; Fryling, 2015). Systems implementation in both HEIs led to significant bad feeling between employee

groups with noticeable suffering in relationships between academics and non-academics, leading to relationship fragmentation (Kuo, 2009). Compromises to effective implementation through absence of stakeholder involvement and tailored development lead to trust diminution in systems and colleagues leading developments. In HEI A, technical staff leading implementation distanced themselves, continuing to be selective in communications and facilitation of system access. Avoiding such working practices through visibility and ensuring exhaustive and regular communication channels to avoid fragmentation is essential (Ho, 2007; Pollock and Williams, 2009; Gunawardhana and Perera, 2015). A major difference between the two HEIs relates academic access levels, leading in HEI A to higher resistance and endurance of parallel systems (Abugabah *et al*., 2015).

Both institutions achieved better student service quality, who can perform numerous tasks online (Pollock and Williams, 2009), thereby releasing resource. Integration with internal University systems is vital, despite not being realised, with differences across academic departments meaning that both HEIs needed to make significant system modifications. System flexibility was not achieved for either intervention.

Both administrators and academics experience processes becoming more formalised and certain operations being systems defined or detrimentally constrained (Kuo, 2009). Academics believe systems defines task execution and hinders various innovations. Systems interfacing post-implementation has led to power shifts from academics to administrators, given preferential access rights favouring the latter, work changes threatening academic autonomy and decline in trust and satisfaction. The findings highlight lack of time and resources spent in identifying most appropriate system requirements and characteristics pre-implementation, becoming evident post-implementation (Spano *et al*., 2009; Scholtz *et al*., 2013; Fryling, 2015; Garg *et al*., 2015).

5.4. Systems Characteristics

This factor was not significant at pre-implementation or implementation but gained relative importance post-implementation despite the necessity to ensure technical appreciation is significant pre-implementation (Coombs, 2015; Ranjan *et al*., 2016). Garg *et al*. (2015) discuss the importance of tools, technology and overall system characteristics for successful implementation. In both case HEIs, these factors were not given necessary priority. The consequence of this was mostly felt post-implementation when staff members experienced the new system protocols and ways of working and felt uncomfortable with the system dictating how they should perform everyday tasks, leading to non-realisation of technical benefits (Coombs, 2015). The lack of technical expertise and shortage of trained staff on the new systems meant that employees were not able to most

effectively deploy them, leading to less system trust but significantly raised conflicts between academics and non-academics. Figure 2 illustrates the levels of reported impact of the four factors across the stages of system implementation.

[Figure 2 goes here]

6. CONCLUSIONS

6.1. Contribution to theory and practice

The contribution to theory is a two-dimensional assessment of significant organisational change centred on deployment of integrated information systems. It considers pre-implementation, implementation and post-implementation of the change against four crucial underpinning areas. These are people and culture (Miller *et al*., 2014; Skoumpopoulou and Waring, 2017), user involvement and associated communication clarity (Pollock and Williams, 2009), management and organisational support (Woo, 2007; Ahmed *at al*., 2018; Khalid *et al*., 2018; Blumberg *et al*., 2019) and systems' characteristics/requirements (Garg *et al*., 2015). This assessment contributes in both approach and empirically determining the relative levels of importance attached to the sub-areas. The research framework and its assessment (Figure 1 and 2) represents theoretical contribution and has been directed through the extant academic literature.

For the project stages, there is relative lack of importance attached to pre-implementation. This represents the preliminary stage to significant organisational change, encompassing the essential foundations for change; so must be raised in stakeholder consciousness. HEIs are complex and incorporate significant system users, across numerous stakeholder groupings and multiple, complex service and process requirements. Single, integrated information systems represent highly ambitious strategic interventions that are perhaps not capable of fully meeting requirements of an individual project brief and subsequent institutional needs. They can be unwieldy, complex and with lack of fit, susceptible to defining the institutional operations, rather than responding. This is exacerbated by low levels of importance attached to system requirements at pre-implementation and implementation s, which contrasts with the importance attached post-implementation. To ensure interventions are "*right first time*", there are obvious dangers with absence of priority up-front and within project implementation.

A practice contribution emerges here around the recognition of benefits and challenges relating to

system characteristics and requirements, emerging through the greater consideration to the post-implementation phase of the change process. There is evidence that data analysis, information sharing, and decision-making are enhanced, but acknowledgement that the systems do not fully integrate various disparate systems institution-wide, with system complexity, restricted access rights to academics representing concerns, areas obvious pre-implementation.

In contrast, across the three project stages, there was much greater importance emerging for people and culture and user involvement and clear communication channels. These are crucial given HEIs operate relatively uniquely, around primary functions, often comprising stakeholders who can be resistant to change (Simonofski *et al*., 2018; Watchaton and Krairit, 2019). Despite the importance highlighted, user involvement was limited within project each stage, input restricted to small, selective employee sets, with limited academic invitation and contribution. A contribution is the significant change-determined role and responsibility shift, with power realignment from the professional to the managerial, with the establishment of decision-makers more akin to counterparts in private sector business. This showcases substantial changes that HE is experiencing and highlights for changes to be successful, senior management cannot ignore the HE environment and specific roles of groupings within. Trust represents an essential change prerequisite here, sustained trust maintenance is crucial for achieving change success. These outcomes are highly dependent upon inclusion and contribution of diverse internal stakeholder groups. Given the changes to role and levels of responsibility, trust maintenance must recognise both organisational hierarchy and be cross-cutting over the recalibrated roles.

This research demonstrates that training on new system implementation is crucial, with essential alignment to the needs of various stakeholder sets. HEIs require role-related training interventions. This is an important finding because it signifies the challenges involved within HEIs and signposts that training needs to be personalised to the different groupings and individual stakeholder roles rather than "*one size fits all*".

Management support emerged as being important at all project stages, particularly during systems' implementation. This reaffirms it as a key critical success factor underpinning IS implementation, organisations regularly underestimating its importance. Organisational support appears to focus less on academic contribution and more on supporting non-academic roles, thereby creating power realignment. Organisational culture is multifaceted within HEIs. Both cases incorporate various sub-cultures, all having perspectives on the importance and execution of University operations. University culture and contributing employees must be central to consideration for new technology introduction. In HEIs where major change has taken place through technological intervention, the value of longitudinal assessment and capturing various stakeholder perspectives

on strategic understanding and the cultural shift towards effective information deployment represents ongoing consideration (Mourad, 2017). Consulting with less senior academics as operational end-users should be central to change, as should be associated communication, which was reported on negatively here. The benefits and challenges presented for both HEIs point to necessary improved communication, whilst the power-shift in decision making represents an important contribution to HEI practice, signposting sector migration towards managerial and market-oriented structures.

6.2. Study limitations and further research

The study involved two case organisations; both large HEI providers as defined by student numbers, one sitting in the top quartile of UK Universities by size (HESA, 2018,) the other with student numbers close to the sector median. Figure 3 presents the 166-institution sector by institutional size, with a median of 13,075 undergraduates and postgraduates (HESA, 2018).

[Figure 3 goes here]

With only two case organisations, there is no intention to generalise for the UK HEI sector. Given the depth of the interviews considered, there is potential for findings transferability. This is particularly true for "*large*" institutions, defined by student body size and organisational complexity defined by its activity range. For the 35 employees capturing various stakeholder groups, there is evidence from the thematic analysis that data saturation was achieved. For the 166 HEIs presented in Figure 3, 44.6% have 15,000 or more students, so experiences reported here are potentially relevant to those HEIs requiring effective IT systems to support both organisational operations and change. The findings may be assessed for this suggested transferability through consideration of stakeholders internal to any additional HEIs with which to cross-compare. There are 21.1% of HEIs which are very much smaller in size (under 3,000 students), therefore some of the key findings particularly around academic role and systems complexity may provide an interesting contrast to the experiences reported. It may also be useful to compare pre- and post-1992 institutions where aspects relating to people and culture may differ, particularly for the former, with its greater academic emphasis on discipline-based research. From the perspective of widening user involvement and recognising people and culture, future research can investigate how project participants are captured within individual HEIs to lead and manage change projects, further investigating the role of academic stakeholders. The power shift in decision making from academics to administrators, with associated career progression is a subject of merit.

In benchmarking the scale of this study with related publications, the participant numbers demonstrates

equivalence. From a comparable qualitative perspective, Garg *et al*. (2015) reported on a focus group with 10 contributors, and from a single case institution, Kuo (2009) involved 18 academics and 18 administrative staff. From an equivalent perspective in terms of interview numbers, but perhaps advantaged by a greater coverage of institutions, Mourad (2017) included 12 interviews with process experts leading to 30 interviews spanning five Universities. Watchaton and Krairit (2019) interviewed 30 staff across various Universities, comparability to this study achieved by capturing the perspectives of administrators, systems' developers and systems' users.

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Table 1: Interviewees Details - number by role and case HEI

Interviewees - Stakeholder Group	**HEI A**	**HEI B**
Senior Management	4	2
Academics	6	5
Professional Support Staff	12	6

Figure 1: Research Framework

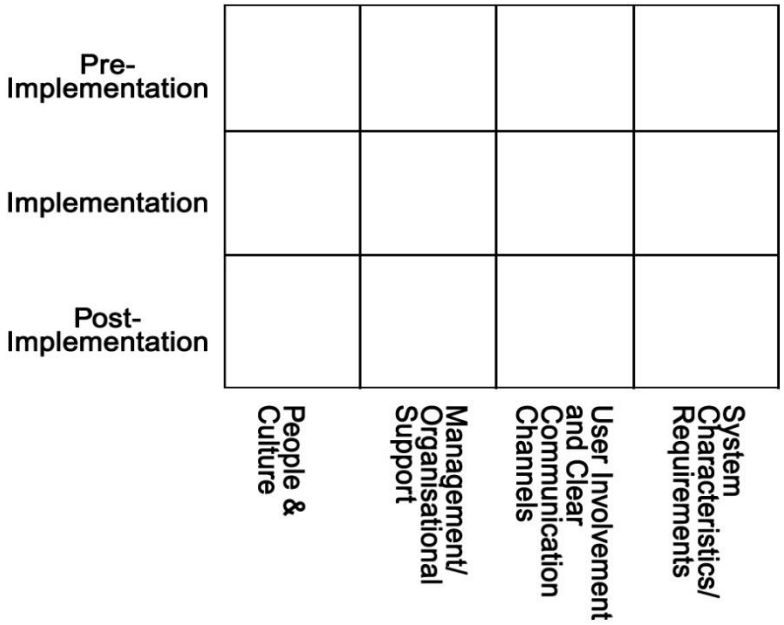


Figure 2: Implementation versus change area – priority levels

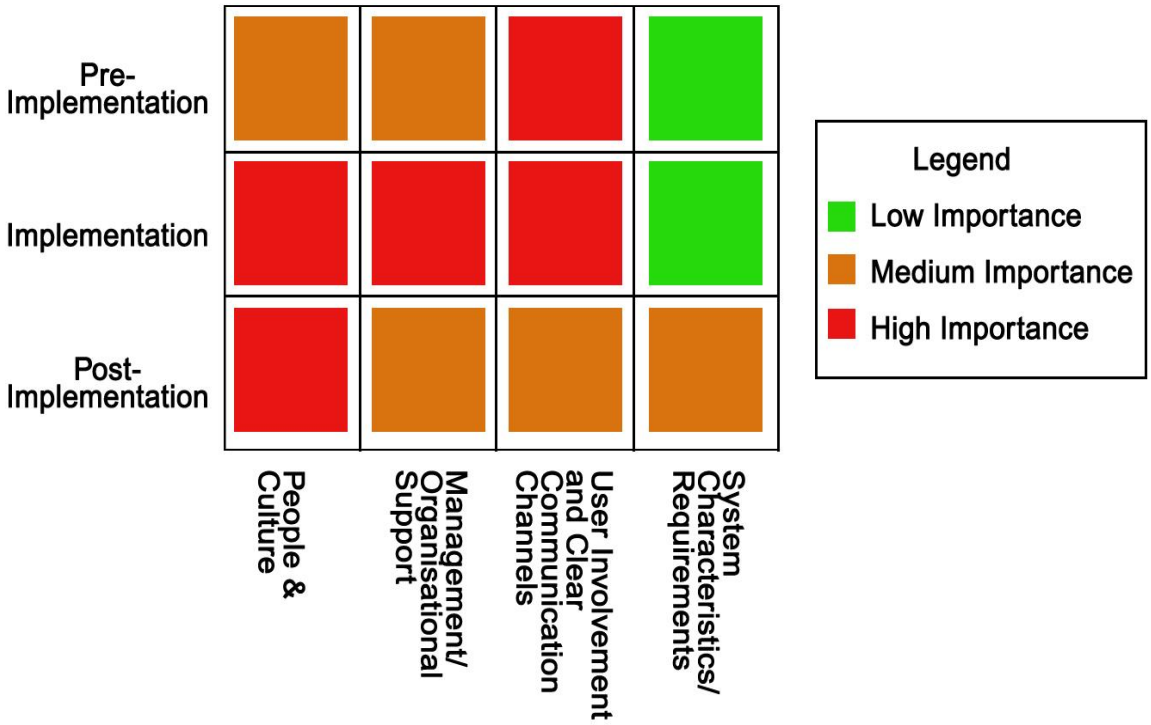
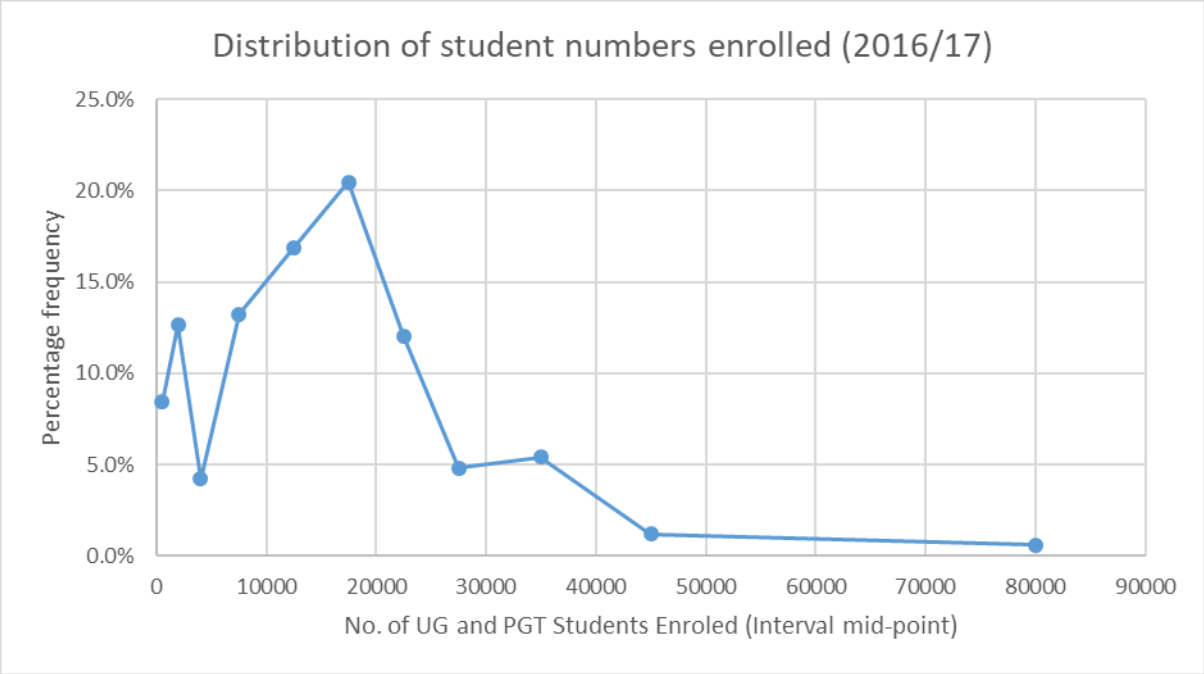


Figure 3: UK Universities size (student numbers)



Data retrieved (June 2019) from:
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