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# A REVIEW OF THE USE OF INTEGRATED INFORMATION SYSTEMS IN THE HIGHER EDUCATION SECTOR

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## **Abstract**

*In Higher Education (HE) institutions, as in many other organisations Information Systems (IS) started as in house developments that tended to satisfy the immediate needs of the different departments and schools. As the universities continued to grow and become international organisations, incorporating students from all over the world, their needs changed and the need for integration across the institution processes intensified.*

*It appears that Higher Education institutions make huge investments on integrated information systems such as Enterprise Resource Planning (ERP) systems; however they do not seem to achieve the full potential of these systems while these new systems significantly alter the way academia is doing things nowadays.*

*Therefore, the focus of this paper is to provide a review of this literature in order to gain insights of the implementation of integrated IS in the HE sector with a special focus on Higher Education in the UK. We start by looking into the use of IS in the HE sector. This sets the scene in order to understand how the HE environment has changed due to the extensive use of IS. From our comprehensive review we develop a number of themes that show the link between integrated IS and the HE environment.*

**Keywords:** Literature Review, Integrated Information Systems, Enterprise Resource Planning, Higher Education

## **1.0 Introduction**

Universities have been undergoing a period of rapid transformation that has seen notions of academic collaboration, knowledge sharing and community engagement (Lewis et al. 2005). Added to the changing values is the more recent push towards reconceptualising universities as informational and more integrated organisations. These changes have altered the traditional nature of universities which tended to be bureaucratic, inflexible, unresponsive and autocratic to more flexible and democratic institutions. However, despite the fact that Higher Education institutions seem to make huge investments on integrated information systems such as Enterprise Resource Planning (ERP) systems, they do not seem to achieve the full potential of these systems (Pollock and Williams, 2009).

Although there is a very rich literature on the HE sector and on IS implementation separately, we believe that a comprehensive review that examines research that combines these two areas can aid researchers to provide a more complete perspective

of the relationship between HE and IS implementation. The goal of this paper is to build upon the prior HE – IS research in order to inform our understanding of the importance of IS implementations in the HE field and to provide substantive directions for future research.

This paper is structured as follows. We start by discussing how the HE environment has changed over the years. Next we present our research methodology before we review the HE – IS literature. Building upon this review we identify 4 themes of research that derive from our analysis. We discuss how universities have evolved through time and how the extensive use of IS has altered the ways that universities operate. We conclude with some propositions for future research and a summary of the main points of our research.

## **2.0 The changing environment of the HE sector**

The changes that took place the last twenty years in the Higher Education sector have been discussed and studied by researchers from different perspectives. Halsey (1992) refers to the ‘humbling’ of the academic profession while Ramsden (1998:351) discusses the shift of academics from professionals to proletarians. Trowler (1998) agrees with Ramsden and suggests that important changes will occur in the labour process of academics due to the rise of the NewU (he used this acronym to refer to the post-1992 English universities). These changes include work intensification, degradation of working conditions, bureaucratization and power shifts for academics and administrators (Becher and Trowler, 2001). They suggest that this situation has been exacerbated by the managerialist applications of information technology.

This introduction of IT and systems has happened across the whole HE sector including the pre-1992 universities. Armstrong et al (1997) point out that technological advancements are transforming not just what happens in the classroom but also the full range of support services, from admissions and advising, to alumni developments and research production. It is suggested that information systems enable managers and administration staff to improve the management of research activities. This then compels members of staff to perform new tasks and develop new ways of doing things. These new processes facilitate the movement from a silo mentality to more integrated core functions. Thus, this suggests that in a number of academic domains, including research, staff are having new systems imposed upon them.

Dutta and Burgess (2003) exploring the use of IS in HE examined the way that managers prioritise the implementation of new IS. They identified the use of a number of management tools that can aid managers to make the right decisions. They point out that universities, like other major institutions, have been faced with the great pressure to satisfy demands for information provision from both internal and external sources. Increasingly, they have to resort to projects to implement IS applications in order to satisfy the requirements of internal and external stakeholders e.g. HESA.

In addition the recent announcement of loss of funding for many universities in the UK will force them to operate more like their private counterparts in order to find new sources of income. All of this complexity and the subsequent squeeze on financial resources have resulted in the perceived need to have organisational information systems which can support the variety of activities within the HEI. Therefore the main aim of this paper is to review the literature in order to better understand the link between integrated IS implementations and the changes that these implementations bring in the HE environment. The next section will discuss the research methodology for this comprehensive review.

### **3.0 Research Methodology**

In order to proceed with the systematic literature review we considered a number of aspects. First it is important to decide which studies we would include in our analysis. Then we adopted an appropriate literature search strategy and finally chose how we will document and code the various studies that we will include in our review. Given that there is a vast literature related to the HE sector it is important to limit our sample to those papers that are concentrating on the implementation of IS. Therefore we decided that we will look for papers that they have as their main themes the HE sector and the implementation of Information Systems. This strategy enabled us to gather a sample that is both manageable and relevant to the aim of our research. Our research method must also satisfy a number of criteria. First we decided to concentrate our research on a number of major research databases that include peer reviewed papers. Our review is looking into relevant research that was published between 1980 and 2015. Using phrases such as “Information Systems”, “Integrated Information Systems”, “Enterprise Resource Planning”, “Higher Education”, “Universities”, “ERP” and “Information Technology” we conducted a search in a number of databases and search engines. The databases and search engines we used are: Wiley

Online Library, Taylor and Francis, Elsevier – Science Direct, Emerald, Google Scholar and Business Source Premier. In order to keep our research manageable we concentrated on these sources for finding appropriate literature and we decided to exclude conference papers and books from our research. In an effort to ensure that we have not overlooked any other articles we also reviewed the references from a number of key articles in our topic area.

The 54 articles reviewed came from 38 different journals. Our method of analysis was first to create a table with the author(s) of the paper and date of publication, the article title, methodology followed and in which journal it was published. Next each article was reviewed in order to determine the following information: the article citation, the methodology followed, whether it was empirical or conceptual paper, whether the study was in the UK or not and a summary of the main findings. The data contained in these tables has helped us to create the basis for the analysis to identify the main themes between HE and IS as well as enabled us to recognise gaps in the literature and directions for future research.

#### **4.0 Literature Review**

We reviewed 54 papers in total and of these 39 articles were empirical and 15 articles were conceptual. Among the empirical studies 16 of them were in the UK and 23 were based outside the UK. The following 4 themes were observed:

- Planning an IS implementation in the HE sector
- The implementation process in a HE institution
- Post-implementation evaluation of the new system
- Impact of the new system in a HE institution

Additionally we reviewed these studies according to the methodological approach. Researchers used a variety of methodological approaches across the board and no particular methodology was more evident than the others. One of the articles was a literature review (Abugabah and Sanzogni, 2010) but their review was not conducted in a systematic way and their findings were predominantly relevant to the Australian HE sector. However, their conclusions did point out that research about ERP system in the HE sector is still at the infancy stage and they called for more research efforts in this area since nowadays universities are either implementing or already using integrated IS such as ERP systems. We will now review the literature based on the 4 themes identified.

#### **4.1 Planning an IS implementation in the HE sector**

In this theme we identified 8 relevant articles in total. 6 of these were empirical and 2 were conceptual papers. From the empirical articles only one was based on the UK HE sector while 5 were non-UK based studies. Also, the practical studies used a variety of methodological approaches. One was a case study, one used mixed methods, one was a qualitative research, one was a quantitative research and 2 were survey based.

The main aspect of this theme is the fact that the studies reviewed summarise on the one hand the factors/issues (McClintock, 1998; Dutta and Burgess, 2003; Ismail, et al., 2007; Ali, 2010; Aldayel et al., 2011; Gorgan, 2015) that HE institutions need to consider before embarking on their implementation journey and on the other hand they discuss some of the benefits (Glover, 1993; Bamel et al., 2014;) that universities can gain once integrated IS are introduced in their institution. Thus, the main findings of these studies can help universities in their planning process if/when they adopt these complex systems.

More specifically, Glover (1993) argues that once implemented successfully integrated IS can enable institutions to improve their service quality and reduce operational costs. Similarly, Gorgan (2015) points out that nowadays universities in order to be efficient and effective they need systems that support their decision processes and offer highly accurate information. From his analysis it is evident that HE institutions are under pressure to analyse and report on various aspects of their student population but currently the systems available do not offer sufficient analysis capabilities. Aldayel et al. (2011) identified 10 main CSFs for a successful implementation of an ERP in a university with project management, ERP system selection and department/stakeholder participation being the most critical ones in a HE environment. Likewise Ali (2010) discusses 9Ss that are important for the planning of an IS project in HE institutions. These are: Specification, Structure, Style, Stakeholders, Strategy, System, Skills, Staff and Specific Information for Institution/Country.

McClintock (1998) found in her research that there are a number of issues that arise when universities implement complex technologies. A major issue that the university in her study faced was the fact that the role of the administrators had changed significantly and that was causing confusion in the roles and responsibilities. However, Bamel's et al. (2014) research which was set in an Indian university and was examining the university's staffs' perceptions about the functions of a Human

Resource IS (HRIS) found that the perceived benefits and barriers of the HRIS do not vary according to the different groups and stakeholders.

It is evident from these studies that more research is needed in the area of planning when universities decide to implement contested systems such as integrated IS. This area will benefit from more studies which can explore relevant CSFs for the education sector and can prepare institutions in their effort to respond to today's challenges and increased demand for accountability. It will also be interesting to explore if the factors of success differ according to the country that the HE institution is based in. Furthermore, university staff need to have a better understanding how these systems can help them in their everyday roles and responsibilities and therefore it is essential for future studies to investigate the benefits that can be realised in universities when integrated IS are used.

#### **4.2 The Implementation process in a HE institution**

This was the most popular area of research with our review discovering 28 articles that concentrated on the implementation process. This category had significantly more conceptual papers with 10 theoretical articles while the empirical articles were 18. 8 studies were in the UK while 10 studies were Non-UK based. We also found that the case study approach was the most popular with 11 articles using it as their methodological line of enquiry. 2 were survey based, 1 was using a combination of observations, reports and Delphi study, 3 were qualitative researches and 1 was a quantitative.

Early research by Jordan (1989), Rothnie (1993) and Hosie (1995) show that there is an increased need for the use of IS in HE and this change is due to the increased demand to respond to government clients, policies and practices. Rothnie (1993) compares the standards and guidelines followed as well as the user interface and functionality of the new system and she concludes that campus wide IS will become a powerful tool for the future of many universities. After 2000 there is a noticeable increase in authors who investigate the use of IS in the HE sector, exactly because these complex systems started becoming a norm and a necessity for universities.

Henrisken (1998) points out that the successful implementation of integrated IS requires the involvement of various university stakeholders as well as an openness to change that might impact the institutional culture. However, as we can see in a lot of the implementation case studies conducted, HE institutions do not follow the same principle when implementing complex IS. For example Fowler and Gilfillan (2003)

attempted to develop a framework which could aid institutions to improve the implementation and development of large and complex ERP type information systems. The main outcome was an IS project management framework providing general guidance and a bridge for cooperation between the very different stakeholder groups involved in IS implementations. They identified that these different stakeholders include senior university management, project team and system vendors. However they omitted the views of the two most important stakeholders forming a HE institution, academics and administrators. Similarly, Okunoye et al. (2008) examine the influence of stakeholders during an ERP implementation in a HE institution. Their study highlights the importance of managers to pay particular attention to the IS users that will be significantly affected of the new system and they conclude that the active involvement of all stakeholders is extremely important towards the successful implementation of an ERP system in a HE environment. However, it is not clear if the HE institution examined did do that or not.

Scott and Wagner (2003) analyse how an ERP implementation reordered the organisational working life in a university. The changes that came due to the ERP implementation resulted into changes to the working rhythms of the university's actors. This seems to be a common aspect of IS implementations in HE (Cornford, 2000; Pollock, 2003; Siau and Messersmith, 2003; Gorr and Hossler; 2006; Getao and Wausi (2008)). One would wonder why universities do not learn from previous mistakes. It appears that even when universities have the opportunity to be actively involved in the design of complex IS such as ERP they still do not realise the full benefits expected. This is apparent in Wagner's and Newell's (2006) research that analysed the strategic partnership between a software vendor and a university who together designed a "best practice" ERP package for the higher education sector. They argue that in a complex environment such as a university where a number of diverse user group coexist, a single industry solution is not going to be "best" from all perspectives. The university where the project took place had to put a lot of effort in order to create a local information system that enabled both the administrative and academic cultures to coexist. Wagner et al. (2006) also reveal that there are a lot of politics involved in the construction, marketing and dissemination of the best practice claims. Their case study showed that the new system changed the ways that the university was operating and once the collaboration with the vendor finished the

university decided to amend the original system in order to make it more effective and efficient for themselves.

Reviewing the articles in this theme we can also summarise a number of learning lessons for HE when they are implementing complex and contested IS. An ERP system can enable academics, researchers and administrators to deal more effectively with the rising numbers of home as well as international students. An integrated university is seen as a strategy for coping with the increasingly diverse student body and enable the university to respond more effectively to new global markets and to meet the requirements of increasingly onerous national regulations (Pollock and Cornford, 2004). However, there are a number of prerequisites if the universities want to fully benefit from such systems. First of all building a management IS does not involve only the underlying technology but it must also consider the people involved because they must make it work both at the development stage as well as at the end user side (Rodrigues and Govinda, 2003). Secondly, as Cramer (2006) discusses the roller coaster ride of implementing IS, is a unique experience for every university but she highlights that collaboration across faculties cannot be optional but it must be essential. Thirdly, building communities of innovation, process change and technology tools that can encourage innovation in a university can be a source of satisfaction and success (Dodds, 2007). Fourthly, Ahmed et al. (2007) found that by setting clear priorities for investing IS institutions can increase their overall performance. They also identified that the main issues of concern in such complex implementations were aspects such as training and resistance to change. Additionally, aspects such as the requirements of data and information, tools and technology, skill development and the overall system design are essential factors for the successful implementation of IS in HE institutions (Ali, 2011). Also, in order for an IS to have a significant impact on the organisational performance from a cost saving perspective, organisational characteristics of information processing capacity must suit its information requirements (Shuhidan et al., 2015). Furthermore, Noaman and Ahmed (2015) argue that ERP systems for higher education should be tailored specifically to address the functionalities relevant to the academic environment. They point out that for an ERP system to be successful in the HE sector it should consider the institutional structure and strategy/policy as well as look into the academic functionalities since they are different from any other sector. Perhaps the most important factor for universities to keep in mind is that if universities are to remain a foundation of a

democratic society then they have to be wise when they chose the use of IS (Agre, 2000).

### **4.3 Post-implementation evaluation of the new system**

Our review also identified 7 articles with the main theme being post-implementation evaluation of the new system. One paper was conceptual and 6 were empirical studies of which one study was conducted in the UK and 5 of them were Non-UK based research. 3 of these studies were case studies, 2 were quantitative researches and one used mixed methods.

Although very few studies were looking into evaluating a new system once introduced in HE institutions the studies reviewed here made an effort to assess how the new system was seen once it become a permanent feature of the university's everyday life. Guan et al. (2002) summarise that when HE institutions invest in technology this requires significant financial, human resources and management contributions. However, what universities and their stakeholders need to comprehend is that such technologies would entail a "paradigm shift" in the way that the university operates. Despite this many institutions fail to seriously consider the consequences of these systems and this is often a cause of dissatisfaction and resistance. As Semiawan and Middleton (1999) report, staff in an Indonesian university found the new system to be average rather than being fully satisfied with it. More specifically their satisfaction was average regarding the quality of information provided, response time to get the information requested, reliability of the data and the overall management of the IS. Similarly, in a study based in the UK, Gemmell and Pagano (2003) discuss how the new system was not accurate and therefore the users did not trust the new system. Additionally, the system was not easy for users to use and this highlighted the need to perform a user skill assessment in order to ensure that end users know how to use the new system. Also, the end users were not appropriately informed of the benefits and reasons behind this new system implementation which brought resistance and negativity towards the new system.

An interesting piece of research which looks into the management and evaluation of an IS in the HE from a different perspective is a study by Kettunen and Kantola (2005). The authors used the balanced scorecard as the basis for managing a campus wide IS and their research found that by developing a portal the new IS reads the data from the basic data sources and combines it in with the data warehouse. This decentralised system enables academics and others to access information across the

institution while it supports the re-use of data which increases effectiveness across the HE organisation. This is a novel idea of attempting to integrate the new system in the university's processes and more research is needed in order to better understand its application. The balanced scorecard is a tool used extensively by organisations in other sectors and perhaps it will be proven useful to examine its use in the HE sector as well.

Integrated IS are nowadays a necessity for all organisations as well as for HE institutions especially since they have to be able to control and report on various aspects regarding their student population. However, as Sabau et al. (2009) argued an integrated IS such as an ERP system is not the one that provides an institution with a competitive advantage. Instead the main focus of a university should be the type of services it provides to its students and the IS should play the role of a facilitator and not a driver in a university's processes. Listening and involving the end users is an important factor that can often make the difference between success and failure. Vathanophas and Stuart (2009) found that age, prior knowledge of systems and education were significant factors that influenced the staffs' perceptions and satisfaction towards a new system. Their research also concluded that because end users often feel uncertain about new systems it is very important for universities to spend time and effort to educate their staff prior to any implementation. Future research can look in greater detail how universities educate their staff when new systems are introduced. It will be interesting to find out more about the training offered, if and how end users are actively involved, as well as to summarise what is the best way of educating the academic community when it comes to the adoption of a new system.

Finally, Fryling (2015) debated that there is a high demand for system maintenance even after an ERP implementation. She argued that actually organisations spend a lot of time on corrective and adaptive maintenance, that they do not have enough time to perfect the new system. This can be even more complicated in a university environment where a number of different processes exist. Again more research is needed in this area as no other study has explored the maintenance that is required for integrated IS in the HE sector.

#### **4.4 Impact of the new system in a HE institution**

Here we discuss 10 articles that explore the impact that integrated IS have in a HE institution. All these articles except one was an empirical research with 6 of them

being in a UK setting, 2 of them were conducted in Australia and one in USA. In this theme most of the articles (6 of them) followed a case study approach while two led a qualitative research and only one did a survey.

Early research by Pollock (2000) and Kvavik and Handberg (2000) discuss what happened when the old system was replaced. They both identified what they call the “transformation” that takes place and they debate how the new system altered procedures and processes. What comes out of these is that by bringing together people disciplined enough to manage the change then a difference between the two systems can be seen. It is evident that once the new system is in place then everything is measured against it and that can cause dissatisfaction among the various stakeholders. As Pollock (2000:363) argues “the new enterprise system begins to allow the production of order in the chaos of the university”.

Further research in this area by Lewis et al. (2005) discusses how the universities were trying to get used to the organisational changes that were caused due to the introduction of networked technology. They found that although managers were interested in strengthening the centralised control through the new technology the academics were looking into the distributed and collaborative possibilities of it. They argue that managers were using the new technology as a driver for organisational change while on the other hand academics were negotiating the different interpretations and implications of the potential uses of that same technology.

Jackson (2011) in fact talks about the different groups and sub-groups that exist in a university in greater detail. His research found that the ongoing social interaction between the various groups/stakeholders, overwhelming power and control aspects, the fatalistic tendencies of the academic staff and the individualistic nature of the user champions resulted to the overall failure of the IS adoption.

More research in this area by Waring and Skoumpopoulou (2012, 2013), Skoumpopoulou and Nguyen-Newby (2015) and Abugabah et al. (2015) shows that the new integrated IS resulted in centralised power in the HE institution and has an impact on the organisational life within it. Also the introduction of these systems has as a result the creation of a strict instrumental policy and power while there is a power shift to central non-academic departments at the expense of academics. It was reported that academics are forced into inflexible processes and form filling while administrators are fighting to use a system that is unfriendly and non-intuitive. Also as Abugabah et al. (2015) mentioned the new system characteristics have a strong impact

on the perceived usefulness of an ERP system and therefore have an effect on user performance. This means that system designers should pay more attention to what users require in order to clearly determine their expectations for the content of an ERP system. They highlighted that although higher education institutions are investing a lot of money on ERP systems, however, there is little empirical research in this environment especially on how these implementations impact the various users involved. This is in line with Gunawardhana's and Perera's (2015) research where they conclude that although there is a difference of how these systems are used and are affecting universities in developing and developed countries, however, it is clear that IS are becoming a necessity in every HE institution because they can help universities to improve the quality of services offered. But with what consequences?

### **5.0 Analysis – IS in the HE sector**

It was discussed earlier on that the shift towards a more widespread education (Cornford and Pollock, 2003, Pollock and Cornford, 2004, Crammer, 2006 and Pollock and Williams, 2009) and away from traditional models has seen new organisational forms emerging in Higher Education. Also as these institutions grow they are faced with an increasing volume of data and information that must be used in a variety of ways for a number of stakeholders. This has led to the establishment of institution wide processes and dependencies in universities and the introduction of an integrated IT infrastructure (Folwer and Gilfillan, 2003, Wagner et al., 2006 Pollock and Williams, 2009). However, often Higher Education institutions seem to make huge investments in integrated information systems but they do not seem to achieve the full potential of these systems (Pollock and Williams, 2009).

One reason why this might happen is because the use of information systems can have crucial political and policy implications as well as generating unintended consequences in terms of institutional and individual behaviour throughout Higher Education which in turn will have a negative effect on collaboration and team work (Becher and Trowler, 2001). Yet, collaboration is seen as a major facilitator when it comes to the implementation of complex information systems in HE institutions. Agee and Holisky (2003) acknowledge that the key to highly effective organisations is to build relationships while they argue that successful collaboration opens up new possibilities for achievements that are not available when people are working alone.

However achieving effective communication in the HE environment can be a challenging endeavour since many diverse groups of stakeholders exist in a university setting. Academics usually have their own agendas (Jackson, 2011) and they see education from a different perspective from that of an administrator who is part of the institution in a supporting role. Academics are on the front line with students and any substantial changes in the HE sector can influence them especially because after all any new policies or new technologies significantly change the way they are expected to operate and perform their jobs as academics and researchers. As it is evident from our review a number of studies did highlight the changing role of academics and the altering environment of the HE sector due to the extensive use of IS (Pollock, 2000; Lewis et al. 2005; Abugabah et al. 2015).

Students nowadays have ownership of their data and they do not have to queue for enrolment or for updating their details. More significantly assignment submissions and marking are often done electronically and that is the testament of the virtual university. The student numbers have risen to the extent that the tutor does not know the individual names, only perhaps being able to recognise the faces. Electronic scanners used for attendance monitoring have removed any opportunity for the academics to be able to familiarise themselves with individual learners. Academia is no longer the holy grail of education but another consumerised industry for making money and offering education en-masse. This power shift (Skoumpopoulou and Nguyen-Newby) means that on the one hand HE institutions view themselves just as another organisation with their students being the customers and on the other hand they are still fighting to keep the ideal of offering the valuable service of educating people and shaping students' future achievements.

Universities are under a lot of pressure to perform in order to be able to have a share of the government funding. However, their performance is strictly monitored and they have to be fully accountable for their student population (Gorgan 2015). This raised need for accountability also intensified the need for more centrally controlled information as well as highlighted the gaps that existed in institutions and their different faculties. Thus, universities have been forced to automate, integrate and closely monitor their processes in order to be able to have a share of the student market as well as the government funding.

This situation has of course caused a lot of resistance (Ahmed et al. 2007) from academics who have seen their role and position diminishing, highly depending on

what the management decides. However, nowadays the managers are not academics and their main interest is how to reduce costs and maximise profit. This shows though that the focus of the universities, which was education, has shifted.

## **6.0 Conclusion**

The studies reviewed offer us rich information regarding the planning, implementation and impact of integrated IS in the HE sector. The main key points that derive from our review are summarised below:

- The Higher Education sector is a complex environment that differs from the other sectors. Although there is a lot of research in the area of integrated IS in organisations a lot of this research is not applicable in a university setting.
- In a HE institution many diverse stakeholders co-exist. These stakeholders have different aspirations and different requirements hence the new system needs to take into consideration all the different elements involved. This often is either not possible or it is overlooked and thus it leads to staff resistance, system incompatibilities and expensive implementations that do not realise the benefits that are expected or promised.
- Research to date has reported that integrated IS have an affect on a university. It is also clear that the education environment has been revolutionised the last 20 years. This transformation has come and continues to come predominantly due to the amazing technological advancements of our time. The question perhaps remains what does the future hold for universities?
- Our review shows that despite all the research already conducted institutions do not seem to learn from the mistakes of others or from the past. Information Systems continue to fail or cause issues and dissatisfaction. What needs to change so that this phenomenon will be significantly improved?

It is evident that more research is needed in the area of IS implementation in a HE environment in order to gain a deeper understanding on how these contentious ISs can be successfully implemented in a complex university setting. Some suggestions for future research are discussed below:

- More research is needed in the area of planning for an IS implementation as well as the post implementation evaluation in the UK HE sector.
- We also noticed a lack of mixed methods studies. Perhaps conducting a survey first to identify some main points and then gain a more in-depth understanding of these aspects will be beneficial in a complex environment such as the HE sector.
- There is no research addressing the project management topic of IS implementation in the HE sector.
- There is a need for studies to explore the impact of integrated IS in other countries except UK, USA and Australia.
- An effort perhaps needs to be made to explore the impact of integrated IS in the HE sector through a survey or mixed method approach. This might enable us to gain a more clear idea what people think and feel when a new system is introduced and then use a qualitative approach to gain an in-depth knowledge of how to approach any potential issues.

But most importantly in order to be able to achieve the required outcomes and maximise the benefits gained from these systems it is also essential to look in greater detail into the changes that these systems bring in the working life of a HE institution and all its stakeholders.

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