A DEGREE OF EMPLOYABILITY:
A RESEARCH AGENDA TOWARDS CURRICULA DESIGN

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Abstract
The challenge of providing commercial science and technology skills in an academic environment stimulates considerable debate, with industry suggesting it cannot be done. In investigating enhancing employability skills of STEM graduates many institutions are considering new initiatives and policies. This research works towards developing models to change practice in curriculum design by embedding industry frameworks. The application of SFIA in course design intends to improve the student journey from undergraduate to graduate to employee by incorporating skills and language required by professionals, into the heart of HE curricula. The paper reflects the efforts to meet these goals and sets out an agenda for research to identify the impact of the approach. A key deliverable is a transferable model for the development of fit-for-purpose academic curricula in HEIs, fully aligned with industry requirements and needs. The research progresses to clarify the impact and effectiveness of this approach.

Keywords
Curricula Design, Employability, SFIA, STEM, Skills Framework

1. Research Aims
The aim of this research is to enhance students' employability prospects through academic IT curricula aligned to industry and government frameworks and establish the credibility of this approach

2. Introduction
The research is part of a broader programme to embed professionalism and employability into the student journey, by building capacity for employability in curricula so students are ready to play an active role in the work environment from day one. This underlines the need for programmes that challenge students' knowledge in professional contexts and recommends deeper linking with government and industry frameworks.

Student employability could be increased by bridging the gap between the practical, experience-lead workplace and the theoretical, research driven academic environment. This could be achieved through the development of practical toolkits to develop fit-for purpose curricula underpinned by research that establishes their worth. The aim is to provide structured approaches for national and international curricula design and importantly evidence to support its effectiveness. This research builds on experience and evidence-informed practice to generate instructional models and best practice processes to direct HEI in successfully embedding SFIA into curricula to achieve full integration of SFIA, permeating all levels of HE curricula with transcripts to illustrate SFIA exposure levels.

Additionally the research identifies practice-based evidence as justification to further direct the development of SFIA to establish a closer fit with HE. This process has to some extent started, but further findings should provide greater leverage and influence, making it easier for other HEI to engage in the process and improve their students' employment prospects.

3. Changing Environments

In addition to the traditional pedagogical drivers, universities find themselves in a new and challenging competitive environment. No longer are they able to enjoy the esoteric culture, they are now forced to be demand driven, with an eye on the added extras that students now expect. In 2012 The Telegraph reported that in the first year of increased fees (not the full amount), places on degree course had fallen nearly 9% compared to the same period in the previous year (Bingham, 20012). Later in the same year The Guardian reported that there was a 7.2% fall in the number of 18 and 19 year old applicants in England between 2012 and 2010, which was the last year of applications before the cap on tuition fees was raised (Vasagar, 2012). Even before the changes in fees, increasing weight was being placed on added value in relation to employability in HE curriculum. Employability became a key objective in most competing universities' strategic plans. Recognising the existence of the professional skills delivered in academic courses, could make it clear to employers that the relevant skills they require are already being delivered in established academic provisions, adding value and improving the saleability of courses.

The Dearing Report (National Committee of Inquiry into Higher Education [NCIHE], 1997) determined that the development of key skills should become a central aim of higher education. In 2010 the government's white paper on 'Skills for Sustainable Growth' identified the need for improved technical skills as technological change accelerates. In 2012 the Wilson review of 'Business-University Collaboration' states the need for strong between universities and employers. The government is recommending skills integration and universities need to drive this forward. However, current discussions (eg The Chartered Institute for their recent debate: "Academic Education will never meet the skills needs of the IT Profession") suggest that academic courses are failing or unable to provide students with the practical requirements needed to operate in the workplace. Strengthening

HEs in the wake of increased fees by aligning with government calls to make universities more effective should have a subsequent positive impact on the economic market.

4. SFIA

Government and industry recognise the importance of skill measures in identifying areas of competence and development. This has obvious application in the academic environment, and based on a review of IT courses, appears to be something that is naturally evolving as frameworks are becoming increasingly utilised. The Skills Framework for the Information Age (SFIA) was established in 2003, with the intention of becoming a common language of IT in business and this can be extended to encompass academic curricula. SFIA is a UK government backed high level IT skills standard. It describes the typical roles in IT and the skills needed to fulfil them, setting standards of professionalism in IT (BCS The Chartered Institute for IT). Originally designed to be a tool for IT Professionals to match the skills of the employees to business requirements, it is easy to see how this framework could support curium design and ensure graduates are speaking the right language.

SFIA, now version 5, defines 96 professional IT skills, structured under 6 category headings, each with significant subcategories. Each skill is identified at up to 7 levels of attainment, described in generic, non-technical terms. SFIA is gaining recognition though the UK IT industry. The IEEE computer society has announced its decision to use SFIA "as the unifying factor in the assessment of information technology skill levels." (Hayes, 2012). SFIA is also gaining international recognition, with over 100,000 subscribers to the framework from over 100 countries. SFIA forum posts from Brazil, South America, Malaysia, Australia, and New Zealand. SFIA claims to "use a common language" (SFIA 2013) which appears to be internationally transferable. Academic courses can tap into this common language to lift the communication barrier between perceived academic theory and industry practices. The removal of inconsistencies in language between the two groups could result in clearing the path between student and employee and ease the student journey.

5. Student Learning Journey

The 2013 Times Higher survey (Gibney 2013) shows that students value high-quality, industry linked curriculum which is emphasised as a key measure of student experience. Well-structured courses designed around employability and in particular embedding SFIA into courses helps to establish a clear purpose for the content delivered. Students' awareness of the context of what they are learning enables them to see the obvious rationales for the topics they are studying. Embedding commercial frameworks provides students with professional language and terminology which, it is hoped, impacts positively on their discussions and work. The use of these in curriculum design promotes challenging academic activities that are valued by students and employers alike. This approach could enrich the learning journey through the promotion of employability and good industry connections providing opportunities for individual growth and maturity.

Increasing the value of degrees and the doors they can open will help to invigorate the student journey, by providing a clear line of sight towards the professional market. The process should develop closer relations with employers, providing greater breadth and depth to the student experience. The core set of skills the research intends to focus on were founded commercially, which promotes greater student focus beyond skills to considering the values and attitudes required by professionals. Using SFIA to provide a summary of commercial tasks undertaken by industry professionals can showcase a greater variety of assessments in HE that relate directly to positions students apply for. This builds students' confidence in their eligibility for responsible roles.

6. Evidence

SFIA is government backed and supported by industry but there is little clear evidence available to HEI's that enables them to decide whether embedding SFIA into curricula is a worthwhile and productive activity. The research aims to establish whether employers are actively aware of the SFIA initiative and what real value, if any, they attribute to SFIA embedded qualifications.

As the countries number 1 university for employability (HESA 2012) the University of Northampton prides itself on providing graduates with the best chances in the business environment. As a small component of this, the field of Information Sciences have spent the last 5 years aligning modules, mapping courses and embedding SFIA into our curriculum. To create a learning curriculum aligned to the sizable framework is a considerable undertaking. There is no doubt in our minds that our courses are consequently more practical and industry facing for it and our students are better prepared to contribute to the work environment. However, we need to evidence whether it has increased our student numbers or improved their chances for a career and that the endless hours of mapping, aligning and redesigning are recognised by businesses.

Our hypothesis was that imbedding SFIA would make our courses unique, more attractive and consequently get more students. It is important to consider the student and employer perspectives to clarify the impact on improving the journey to gradate employee. Defining SFIA job profiles, supporting learning opportunities and carry out assessments is a significant task for employers and consequently is getting employees on board with SFIA. Many employers are not aware of SFIA or understand it when students claim to be exposed to SFIA levels. Many companies do not utilise SFIA or apply it in their staff development. Equally, if you ask our new students 'what is SFIA?' they can't tell you. Now that students need to invest in HE, is a course with a clear career path simply more appealing than the old hobbyist approach to course selection, popular when HE was free at source. Consequently, it is important to assess whether we are providing graduates with the first step on the industry's skills ladder or if we are still out of step with the so called 'real world'.

7. Research Outputs

An important performance indicator of the project is to assess the successful development and application of practical and applicable tools to achieve or replicate such results in the wider HE sector to enhance the employability criteria. The research agenda focuses on a number of key areas, practical and theoretical including, students' and employers' awareness of and value attributed to, SFIA and the measurable value of embedding it into HE courses.

At a practical level the research has begun to "package new ideas in familiar theory" (Hovland 2004) by developing a matrix that envelopes traditional theory such as Bloom's verbs and Doran's SMART objectives into our SFIA based curriculum. Areas of practical development include best practice toolkits for embedding SFIA into curricula such as:

- ☐ Module Task Matrix and Radars (see attachment);
- ☐ Steps to generate Curricula Task Profiles;
- ☐ Blooms verbs and year/level of attainment (UK) (see attachment);
- ☐ Bloom's | SFIA verbs taxonomy (see attachment);
- ☐ SMART | SFIA Level Matrix (see attachment).
- ☐ Flow diagram for writing:
  - Assessment Strategy;
  - SFIA Derived Module Descriptions;
  - SFIA Derived Module Objectives;
- ☐ Student transcripts mapping SFIA exposure level on their course.

8. Research Impact

The research is designed to impact on policies involved in designing curricula and to "establish legitimacy" (Hovland 2004) in the application of SFIA in curricula development. "Building up programmes of high quality" and "action-research and pilot projects to demonstrate benefits of new approaches" (Hovland 2004). In addition it aims to directly influence the development of SFIA to increase its application and usefulness to all HEI and boost the employment prospects of Computing and Information Science STEM graduates.

The research needs to generate practice based evidence to challenge The Chartered Institute for their debate that: "Academic Education will never meet the skills needs of the IT Profession". Critical success factors will be determined by an evaluation of the benefits to stakeholders; students, employers and HEI. The research aims to impact HEI's practices by changing the way they develop STEM curricula through the application of best practise toolkits and provide benefit to HEIs by enabling them to illustrate their endeavours at embracing government skills initiatives.

9. Conclusion

The project is intended to be a longer strategy of research, starting a journey into evidencing the value of developing employability focused degrees. It is hoped that the project, as well as adding value to the student journey, will enhance students' employment prospects by aligning academic IT curricula to industry and government frameworks. The continued research needs to address the underlying concerns about SFIA awareness which may be hindering its application. It is hoped that as our students progress and are embedded in industry they will be banging the SFIA drum and develop its visible application. However, the significant SFIA implementation process may mean that SFIA never really becomes the IT communication standard in industry and is consequently irrelevant in HE.

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