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A REFLECTIVE PRACTICE STUDY ON THE DEVELOPMENT OF A MASTER OF INFORMATION TECHNOLOGY PROGRAM: A DESIGN SCIENCE RESEARCH APPROACH

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ABSTRACT

This paper documents the design of a new Master of Information Technology (MIT) degree for Belgium Campus iTversity. Following a Design Science Research (DSR) approach, the MIT programme itself is treated as the research artefact. The study responds to South Africa's critical shortage of ICT skills and to the mismatch between research-heavy postgraduate programmes and industry needs. Drawing on literature, stakeholder consultations and reflective practice, the programme is designed to integrate industry at every stage, foster advanced technical mastery, and encourage student autonomy and relatedness. Key innovations include industry representation on review committees, masterclass milestones where students share expertise with juniors, a state-machine-based process for flexibility and transparency, and a valorisation model that turns postgraduate projects into a continuous pipeline of opportunities for subsequent cohorts and partners. The proposed model offers a blueprint for bridging the skills gap while maintaining academic rigour.

KEYWORDS: *Curriculum Design, Higher Education, Reflective Practice, Design Science Research, Postgraduate Program Development*

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NOTE: *In this paper, whenever reflective comments are made, these will appear in italics and will be presented from a first-person perspective.*

INTRODUCTION & BACKGROUND TO THE STUDY

The rapid evolution of the technology sector necessitates that postgraduate programs be agile, industry-aligned, and pedagogically sound. The South African technology sector is expanding rapidly, yet employers consistently report a shortage of suitably qualified candidates. Two recent government lists underscore the severity of this gap: the Department of Higher Education and Training's National List of Occupations in High Demand for 2024 and the Department of Home Affairs' Critical Skills List for 2023. Both highlight positions such as ICT systems analysts, data scientists, software and web developers, programmer analysts, database designers and administrators, network and systems engineers and ICT security specialists as critical and scarce (DHET, 2024) (Department of Home Affairs, 2023). The overlap across lists underscores just how acute the shortage is—these roles are essential to digital transformation yet remain difficult to fill.

Surveys of practitioners reveal further misalignment between higher education and labour market needs. The IITPSA 2024 ICT Skills Survey found that most respondents held some form of tertiary qualification, yet only about half found employment immediately after graduation (IITPSA, 2024). Respondents reported that they primarily used online courses and certifications to acquire practical skills, with seminars, workshops and e-learning preferred over formal academic programmes. These findings underscore the need for flexible, industry-relevant postgraduate programmes. These findings, combined with the rapid digital transformation of industry and employer expectations for graduates who are immediately productive with modern tools and agile mindsets, underscore the need for programmes that recognise prior experience while equipping learners with future-oriented skills (DHET, 2024) (IITPSA, 2024). Balancing prior learning with new mastery therefore became a guiding principle of our design.

One of the core reflections in this process is that, based on my experience in supervising at multiple institutions is that even when industry problems are considered at the postgraduate level, industry is not integrally involved in the academic process. It is not uncommon for students to try and incorporate problems and knowledge from their working life into their studies, but because of the overly "academic" nature of Master's degrees in the South African context, at least *where I have been involved, it is difficult to truly bridge the gap between the workplace and the academic context. This is something I discussed with many of my partners, and had a large influence in the design of the program in its current form.*

In 2025 Belgium Campus iTversity received provisional approval for the offering of a Masters of Information Technology starting in 2026 with some short term conditions that needed to be addressed. Although an initial design was done for the program, the philosophical, methodological and structural components of the course were not yet defined to the point where it was ready for students to be taken into the course during the initial application. As such, in 2025 an intensive process of research and consultation was undertaken to design the program so that it can reach its full potential and finalise the initial design. As a higher education institution that seeks not only to qualify students at the Masters level, but that also wants to make a meaningful impact in the lives of those students and the industries and communities they find themselves in, this is the context within which this project finds its genesis.

RESEARCH DESIGN METHODOLOGY

Design Science Research (DSR) frames artefact creation as scholarly work that simultaneously solves practical problems and contributes to knowledge. In this paradigm the environment defines the problem domain, the knowledge base provides theories and methods, and the design process iteratively builds and evaluates artefacts (Hevner, March, Park, & Ram, 2004). Peffers et al. extend this paradigm by proposing a methodology that begins with problem identification, sets objectives, develops the artefact and iterates through demonstration, evaluation and communication (Peffers, Tuunanen, Rothenberger, & Chatterjee, 2007). Figure 1 depicts the DSR process we adopted.

Rather than re-explaining DSR at length, two principles were central to our design. First, the artefact—the MIT programme—must address a clearly articulated need. Second, feedback loops must inform continuous refinement. Because curriculum design involves human factors, we complemented DSR with reflective practice.

Bain et al. propose a 5Rs framework for reflective writing which we adapted for this project (Bain, Ballantyne, Mills, & Lester, 2002). The five steps as we interpreted them were: first describe what happened, then reflect on thoughts and feelings, connect the experience to prior knowledge, analyse underlying causes and finally plan improvements. Throughout the design process the author recorded observations and ideas in diagrams, digital notes and self-addressed emails. For example, after an early meeting with industry partners raised concerns about ethics approval, reflecting on similar experiences from past projects prompted the author to streamline the ethics process while preserving necessary oversight. Such iterative reflection ensured that decisions were grounded in both data and practitioner insight.

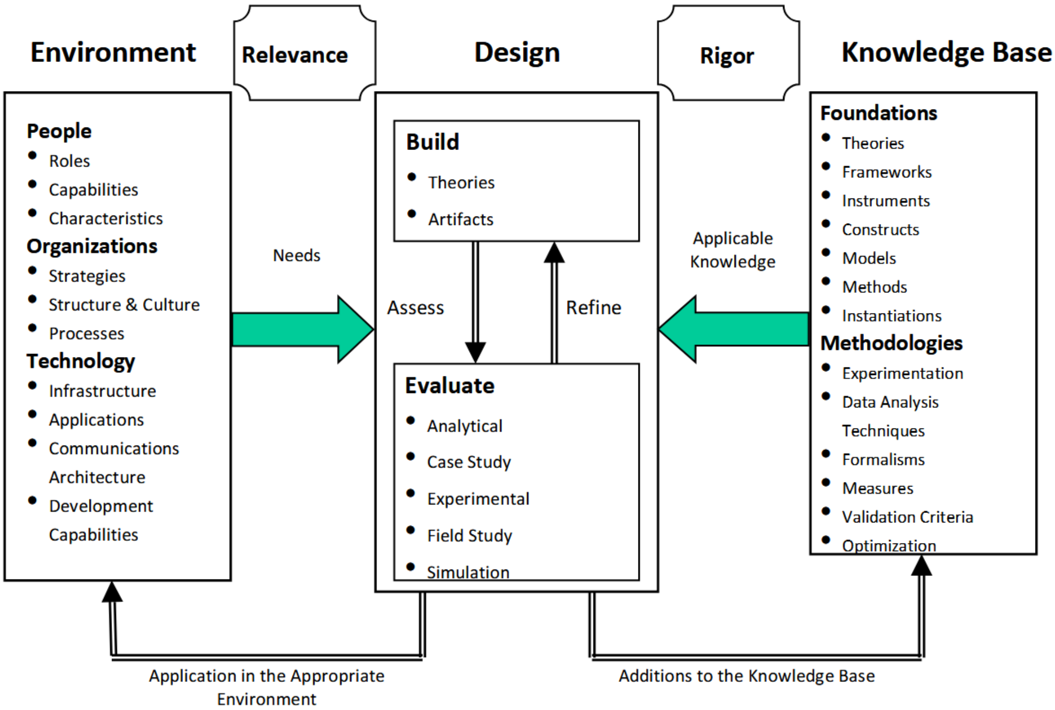

Figure 1 Design Science Research Process as Described in (Hevner, March, Park, & Ram, 2004)

In capturing my thoughts during the different parts of the research and design process I didn't use a formal journal however, and instead used a combination of diagrams so that captured thoughts could be shared with stakeholders and expert advisors in presentations, notes in text format in digital notes so that they could be refined over time, and finally emails to myself sent often from my phone so that I could capture relevant thoughts whenever they emerged.

IDENTIFIED NEED AND RESEARCH QUESTIONS

At the heart of this study is the need for a master's programme that produces graduates with advanced, industry-relevant skills, strong research capability and clear differentiation. The research questions guiding the project were:

1. What is the value of a Master's degree in Information Technology? We defined value not just in terms of employability but as a combination of advanced skills, real-world impact and sustained career growth (Feder, 2025) (University of the Potomac, 2022).

2. What role should industry play in the structure and execution of an MIT? Rather than limiting industry input to advisory boards—which are often superficial (Taylor & Calitz, 2020) (El-Refae, Askari, & Alnaji, 2016) —we sought to embed participation throughout the programme lifecycle, from proposal conception to final assessment.

3. How can students be motivated to engage fully with postgraduate study? Recognising that many master's students are working professionals, we adopted milestones, peer interaction and feedback mechanisms aligned with Self-Determination Theory, which emphasises autonomy, relatedness and competence as drivers of intrinsic motivation (Ryan & Deci, 2020).

Reflecting on my transition from industry to academia, I initially believed that a master's degree would demonstrate specialised technical mastery. Yet at many institutions the emphasis is on research methodology rather than advanced technical skill. Our goal in designing the MIT was to restore the notion of mastery by balancing research capability with technological depth and direct relevance to industry.

LITERATURE REVIEW

Universities employ diverse narratives to persuade prospective students of the value of a master's degree. At the University of Phoenix the MIT is marketed as a vehicle for career advancement, salary growth, management skills development and staying current in a fast-moving field (Feder, 2025). They stress that employers often look for proof of dedication to learning and that advanced degrees signal commitment and competence. The University of the Potomac positions the degree as a bridge to management and leadership roles; students can specialise in a desired field, use the latest technologies and build networks, thereby boosting their marketability and earning potential (University of the Potomac, 2022). Marymount University emphasises that the IT field is broad and continually evolving; continuing to postgraduate study helps students navigate the nuances of its sub-disciplines. They list advantages such as (Gaona, 2024):

- Career advancement opportunities in ICT;
- Specialised knowledge and skills development;
- Increased earning potential and marketability;
- Access to advanced research and innovation;
- Networking opportunities and professional connections;
- Leadership and management development; and

- Adaptability and future-proofing of technology careers.

Taken together these narratives illustrate that postgraduate study fosters professional identity and a sense of belonging in a community of practice. Collaboration, mentorship and exposure to advanced research enable students to build networks that support their careers—an important benefit in a fast-moving field like IT. Positioning the degree as a gateway to a professional community, rather than merely a collection of modules, resonates with mid-career professionals seeking to reposition themselves.

These perspectives suggest that an MIT should not simply extend undergraduate study but deepen knowledge, develop expertise, enable leadership opportunities and provide access to cutting-edge research and industry networks.

Beyond marketing materials, research literature emphasises problem-based and industry-oriented learning. Perrin and Sun demonstrate that integrating real industry projects into teaching improves graduate employability by enhancing technical skills and contextual understanding (Perrin & Sun, 2022). Their findings support a design-centric, pragmatic approach. Studies of Industry Advisory Boards (IABs) further highlight the importance of industry engagement. Taylor and Calitz describe IABs as vital links between academic departments and the labour market; they provide curriculum feedback, assist with strategic planning, support accreditation and can offer internships and mentorship (Taylor & Calitz, 2020). El-Refae, Askari and Alnaji show that diversity of advisory board members and their involvement in defining institutional vision and obtaining accreditation correlate positively with educational quality (El-Refae, Askari, & Alnaji, 2016). IABs help programmes keep pace with technological change and ensure that research topics are relevant and impactful.

Motivation is another central theme. Self-Determination Theory (SDT) posits that three psychological needs—autonomy, relatedness and competence—must be met for learners to experience intrinsic motivation (Ryan & Deci, 2020). Educational environments that allow students to control their learning, connect with peers and mentors, and demonstrate growing competence foster engagement and wellbeing. Conversely, misalignment between study and work, lack of agency or limited support can lead to attrition. In the IITPSA survey, the popularity of seminars, workshops and online courses over traditional programmes suggests that flexibility and perceived relevance drive participation (IITPSA, 2024). Designing a postgraduate programme that meets these psychological needs is thus imperative.

FINDINGS, REFLECTIONS AND DISCUSSION

Several themes emerged from our literature review and consultations with stakeholders:

- Industry integration is essential. Programmes must embed industry actors in curriculum design, supervision and assessment. Stakeholders emphasised that this integration should be substantive rather than symbolic.
- Programme value must be explicit. Prospective students need clear links between the degree and enhanced career prospects—higher salaries, specialised expertise, managerial opportunities and leadership roles.
- Advanced skills and lifelong learning. A master's degree should impart deeper technical knowledge and research skills while fostering habits of self-directed, lifelong learning.
- Management, networking and communication. Leadership and project management skills, networking opportunities and the ability to communicate complex ideas were repeatedly highlighted as crucial.
- Flexibility and support. Working professionals require programmes that accommodate their schedules and provide strong support structures. Simplifying administrative hurdles such as ethics approval was therefore important.

To ensure the programme addressed these themes we engaged both formal and informal stakeholders. Formal input came from industry and academic advisory boards, the institution's quality and management structures, while informal conversations with mentors, former students and leadership provided practical insights. This interplay ensured that ideas sparked in informal discussions were later formalised through committee deliberations.

Is a design-centric Master's of Information Technology Feasible?

Benchmarking against existing programmes confirmed feasibility. Claremont Graduate University's Information Systems and Technology MS emphasises design-centric, industry-focused learning (Claremont Graduate University, 2025). The University of Michigan's design science curriculum integrates design knowledge and practice with a practical focus (University of Michigan, 2025). Marymount University's MIT allocates a large portion of coursework to practical software engineering and emphasises faculty who are practitioners (Marymount University, 2025). The University of Arizona's master's in Information Science features comprehensive system design and implementation through capstone projects (The University of Arizona, 2025). Collectively these examples demonstrate that a design-centric MIT is both feasible and attractive to students.

While the benchmarked programmes share a commitment to real-world problem solving and close ties with industry, each achieves this differently. Claremont's degree uses studio classes in which teams develop prototypes for partner organisations; Michigan emphasises project-based design research culminating in a dissertation; Marymount requires internships or practicums; and Arizona's programme includes a two-semester practicum that simulates enterprise-level projects. None of these models, however, combines rolling admissions, formal workflow modelling and a valorisation pipeline as proposed here. Our design therefore complements international best practice while introducing innovations tailored to South African needs.

DESIGN

A full report of all expert review sessions and stakeholder engagements would be difficult to capture in a single paper considering how many interactions were held, but the themes captured above will be used to highlight how the consultation and research process was used to guide the design of the program. As the program was still in its conceptual and initial design iterations, the main tool used for evaluation was expert review. Two parts of the program's overall design will be highlighted, namely the process followed in the program, and the overall strategy of valorisation. In terms of the process, Figure 2 shows the flow that the student goes through. This is similar to the process found in many other institutions, with a number of structural differences.

Figure 2 Flow through the Program

Traditional postgraduate programmes typically involve proposal approval, research and a final defence. Our design expands this trajectory to include multiple milestones and substantive industry involvement.

We distilled these innovations into four interlocking elements:

1. Integrated industry engagement. Projects are co-defined with industry, and proposals are reviewed by committees comprising both academics and practitioners to ensure relevance, ethical alignment and immediate applicability.

2. Masterclasses and peer learning. After proposal approval, each student delivers masterclasses on state-of-the-art developments and research methodologies to junior cohorts. These sessions build competence and relatedness while exposing younger students to emerging topics and modelling scholarly practice.

3. State-machine administration. A custom digital workflow tracks progress from proposal through ethics approval, milestones, supervision meetings and final submission. The system supports rolling admissions, flexible pacing, automatic document generation and transparent monitoring.

4. Continuous feedback and demonstration cycles. Supervisors meet regularly with students at key transitions, and masterclasses, deliverables and committee reviews serve as demonstration and evaluation points. Structured feedback is logged in the system and informs continuous improvement.

Collectively these elements create a dynamic and transparent learning environment. Industry integration keeps topics current and fosters mentorship relationships; masterclasses build a peer-to-peer knowledge network; the state-machine supports individual pacing while preserving oversight; and continuous feedback embeds evaluation into the programme itself. Together they differentiate our MIT from traditional, cohort-based programmes and align it with DSR principles.

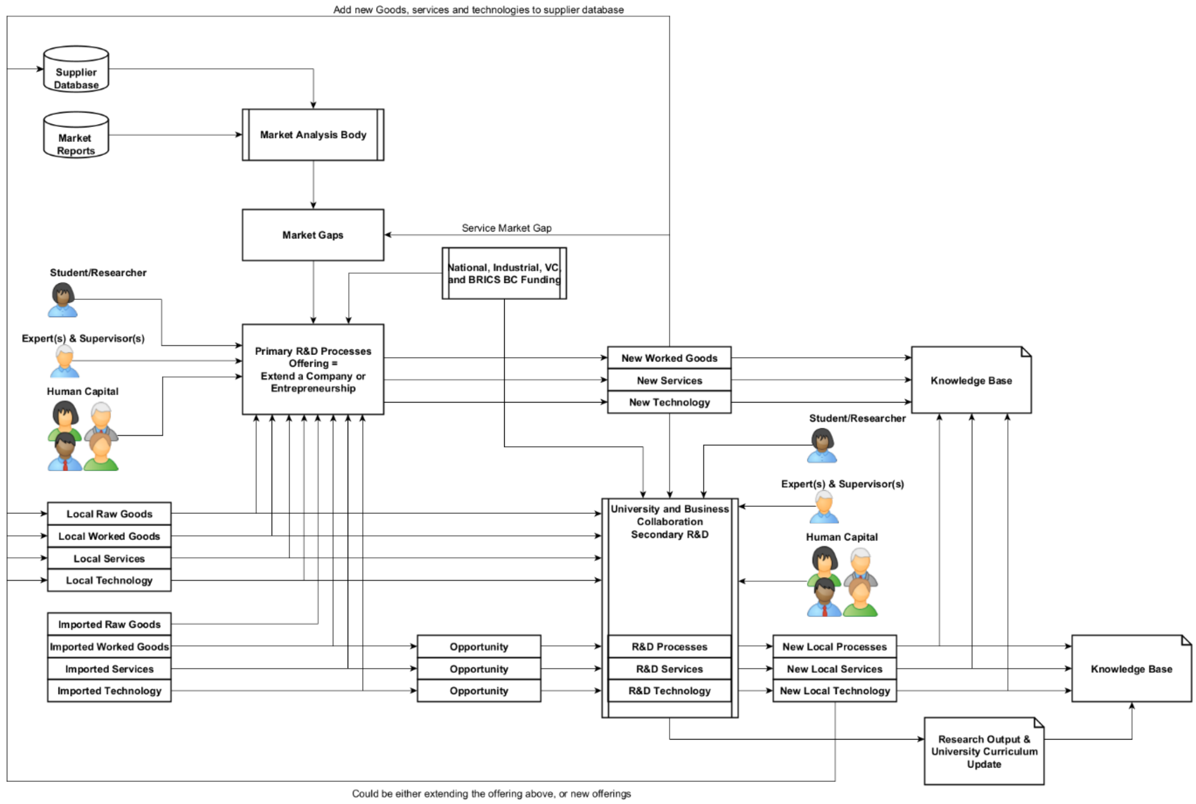

Figure 3 Valorisation Model

In terms of the valorisation model, Figure 3 shows the full model that has been developed. Traditional postgraduate research often culminates in a dissertation that sits unused. To avoid this, we developed a valorisation model that positions master's projects within a circular knowledge economy. The model works as follows:

- R&D identifies gaps. Each project begins by examining gaps in the market and in partner organisations' offerings. Students draw on local and global sources of goods, services and technologies to design solutions. Local sources might include South African companies and community needs, while global sources could include open-source technologies, international standards or emerging research.
- Projects generate opportunities. The act of identifying sources and designing solutions reveals secondary opportunities—for example, the need to develop local versions of imported technologies or to create support services for new products. These become new projects for subsequent students.
- Knowledge flows to peers. Masterclasses disseminate lessons learned and state-of-the-art insights to junior cohorts. This ensures that the student body remains current and ready to take up emerging topics. Because masterclasses are tied to specific milestones, knowledge transfer is built into the programme rather than left to chance.

- Partners benefit. Industry collaborators gain access to innovative solutions and a pipeline of graduate talent. In turn they provide feedback, resources and real-world problems for students to tackle. The model encourages partners to return with new challenges, sustaining the knowledge cycle. By systematically identifying gaps, catalysing secondary opportunities and sharing knowledge across cohorts, the valorisation model turns each project into a node in an innovation network. Partners benefit not only from the solutions delivered by students but also from the repeated engagement that builds trust and mutual understanding. Students, in turn, gain access to a diverse array of problems and resources, and their work contributes to a growing repository of tools, techniques and case studies. Over time this model can transform the institution's research portfolio into a continuous cycle of innovation that contributes to regional economic development.

RECOMMENDATIONS

In developing this program it has become clear that for higher education institutions to remain relevant that there needs to be a focus on not only research as an end in and of itself, but rather a closer relationship between institutions of learning and the industries that they serve. It is not necessary to have higher education institutions focus only on career readiness, but the current misalignment in the South African context captured in the concept of the "skills paradox" is unsustainable. In this paradox higher education institutions are producing more and more graduates, and yet even though there is a high level of unemployment, there are still positions that remain vacant and skills on the critical skills list because employers are not finding the skills they need among graduates. Closer alignment in this context is not only a good idea, but an existential imperative. The findings from stakeholder consultations and literature analysis consistently highlighted the need for closer ties to industry and to ensure students not only gain theoretical and conceptual knowledge, but also economically viable skills and the ability to apply the same to their workplace context.

This study therefore recommends that higher education institutions adopt design-driven approaches that embed industry collaboration, systematic program evaluation and graduate employability measures into postgraduate program design. The MIT program developed here serves as a prototype of such alignment, offering a model that addresses the 'skills paradox' while sustaining academic integrity.

The following steps in the study will be to do a final refinement once the state machine system has been integrated into the Learning Management System and trialed to ensure it functions as designed. The first pilot run of the system will take place in 2026.

REFLECTIVE CONCLUSIONS

Designing this programme has reinforced my belief that meaningful collaboration between academia and industry is essential for addressing South Africa's ICT skills gap. The process also highlighted the value of reflective practice in curriculum design. Recording observations, emotions and ideas allowed me to identify patterns and make deliberate adjustments rather than reacting ad hoc. Through ongoing dialogue with colleagues, mentors and students I gained insights that shaped the final artefact. I remain grateful to Prof Reolyn Heymann, Ms Jacqui Muller and Prof HB Klopper for their support and inspiration. Looking ahead, I hope to explore additional ways for postgraduate students to mentor junior cohorts, to build stronger partnerships across institutions and sectors, and to study the long-term impact of design-centric curricula on graduate careers and industry innovation. As the digital economy evolves, continual collaboration across sectors will be vital; I believe the MIT described here offers a blueprint for such collaboration.

REFERENCES

Bain, J. D., Ballantyne, R., Mills, C., & Lester, N. C. (2002). *Reflecting on Practice: Student Teachers' Perspectives.* Flaxton: Post Pressed.

Center for Self-Determination Theory. (n.d.). *Center for Self-Determination Theory*. Retrieved from Theory Overview: https://selfdeterminationtheory.org/theory/

Claremont Graduate University. (2025). *Center for Information Systems & Technology*. Retrieved from Information Systems & Technology: MS in Information Systems & Technology: https://www.cgu.edu/academics/program/ms-information-systems-and-technology/

Department of Home Affairs. (2023). *Critial Skills List.* Department of Home Affairs.

DHET. (2024). *National List of Occupations in High Demand: 2024.* DHET.

El-Refae, G. A., Askari, M. Y., & Alnaji, L. (2016). Does the industry advisory board enhance education quality? *International Journal of Economics and Business Research*, 32-43. doi:10.1504/IJEBR.2016.078800

Feder, M. (2025, May 22). *Is a master's degree in IT worth it?* Retrieved from University of Phoenix: https://www.phoenix.edu/articles/it/is-a-masters-degree-in-it-worth-it.html

Gaona, J. (2024, May 13). *Is a Master's in Information Technology Worth It?* Retrieved from Marymount University: https://marymount.edu/blog/is-a-masters-in-information-technology-worth-it/

Hevner, A. R., March, S. T., Park, J., & Ram, S. (2004). Design Science in Information Systems Research. *MIS Quarterly, 28*(1), 75-105. doi:10.2307/25148625

IITPSA. (2024). *2024 IITPSA ICT Skills Survey.* IITPSA.

Marymount University. (2025). *Marymount University*. Retrieved from Marymount University MSIT Degree – Master’s in Information Technology: https://marymount.edu/academics/college-of-business-innovation-leadership-and-technology/school-of-technology-and-innovation/graduate-programs/technology-master-s-programs/information-technology-m-s/

Peffers, K., Tuunanen, T., Rothenberger, M. A., & Chatterjee, S. (2007). A Design Science Research Methodology for Information Systems Research. *Journal of Management Information Systems*, 45-77. doi:10.2753/MIS0742-1222240302

Perrin, S., & Sun, H. (2022, 12 1). Graduate Employability through Industry-Oriented, Problem-Based Learning: A Case Study. *African Journal of Inter/Multidisciplinary Studies, 4*(1), 43-56. doi:https://doi.org/10.51415/ajims.v4i1.1023

Ryan, R. M., & Deci, E. L. (2020). Intrinsic and extrinsic motivation from a self-determination theory perspective: Definitions, theory, practices, and future directions. *Contemporary Educational Psychology, 61*. doi:10.1016/j.cedpsych.2020.101860

Taylor, E., & Calitz, A. (2020). The Use of Industry Advisory Boards at Higher Education Institutions in Southern Africa. In B. K. Tait (Ed.), *SACLA 2019.* Springer.

The University of Arizona. (2025). *University of Arizona College of Information Science*. Retrieved from MSIS Capstone Projects: https://infosci.arizona.edu/ms-information-science/capstone-projects

University of Michigan. (2025). *Michigan Engineering Design Science*. Retrieved from Design Science: https://designscience.engin.umich.edu/

University of the Potomac. (2022, July 30). *Is a Master’s Degree in IT Worth It?* Retrieved from University of the Potomac: https://potomac.edu/the-market-value-of-a-masters-in-information-technology-degree/