International Journal of Applied Research in Business and Management (ISSN: 2700-8983)
Volume: 07 Issue: 08 Year: 2026
https://doi.org/10.51137/wrp.ijarbm.595

Determinants of Employees' Adoption and Continued Use of High-Performance Computing Systems at a Selected Historically Disadvantaged Institution in South Africa

Authors:

L. Ledwaba (lethaboledwaba132@gmail.com)
University of Limpopo, Polokwane, South Africa

T.S. Setati (tlou.setati@ul.ac.za)
University of Limpopo, Polokwane, South Africa

H.R. Maluka (harriet.maluka@ul.ac.za)
University of Limpopo, Polokwane, South Africa

Abstract:

The landscape of technology has significantly changed over the last decade. For the past two decades, the integration of technology has been something that people have struggled to adopt to. However, little research has been done to examine how this sense of technology integration develops and evolves. The adoption or rejection of new High-Performance Computing technology is still up for debate, given its rapid development and increasing integration into users' personal and professional lives. The primary purpose of this study was establishing the determinants of employees on the adoption and continued use of high-performance computing and mechanisms that can be integrated at a selected Historically Disadvantaged Institutions. A qualitative research design was implemented with the use of semi-structured interviews to collect data from a sample of 12 people. Thematic analysis approach was utilised to analyse and group emerging themes and sub-themes. Findings stated that, education, training and development influenced the integration and continued use of High-Performance Computing can be encouraged in Higher Education Institutions. It is recommended that for future implications, studies should make use of computation knowledge to integrate solutions that will solve problems that affect the implementation and use of High-Performance Computing in more industries.

Keywords:

High Performance Computing, Perceptions, Technology Adoption, Attitude, Intention, Historically Disadvantaged Institutions

Submitted: 2026-02-16. Revised: 2026-04-06. Accepted: 2026-04-20.

WOHLLEBE & ROSS

Discover publication opportunities:
www.wr-publishing.org

International Journal of Applied Research in Business and Management (ISSN: 2700-8983)
Volume: 07 Issue: 08 Year: 2026
https://doi.org/10.51137/wrp.ijarbm.595

Introduction

Ever since the incorporation of technology into education was acknowledged as a crucial factor in enhancing both instruction and learning outcomes (Sumak et al., 2011), research on why people choose to utilise technology in higher education has grown in popularity (Sumak et al., 2011). Technology has become a current growing infrastructure in these modern times (Cheon et al., 2012; Sa´nchez et al., 2020; Susskind, 2023). It is progressively being implemented in the global labour market (Bandalos et al., 2019), which makes it easier for organisations to automate routine tasks (Eickholtz & Shrestha, 2020; Vrontis et al., 2023). The option of whether to accept or reject technology is still up for debate because of its rapid advancement and incorporation into people's personal and professional lives (Manyika & Chuli, 2020). This has the potential to upset the balance between human and machine-based job responsibilities in the workplace (Ibukun & Daramola, 2019).

Recently, there has been a new integration of High-Performance Computing (HPC) Technology within Historically Disadvantaged Institutions (HDI) for the use of academics and students (Scott, 2022). In today's technological environment, the advent of HPC is transforming the face of humanity (Roberts, 2023). HPC is the capacity to process information at very high speeds and carry out intricate calculations (Edison et al., 2018). Researchers in higher education institutions around the world are using HPC systems to assist them in addressing challenging problems in a range of fields, including business, science, engineering, and mathematics (Appleton, 2013; Yao & Lu, 2023). Ferlie et al. (2021) are of the opinion that HPC varies depending on the institution. These HPC technology initiatives are being made possible by developments in cloud computing, advanced networks, security, and identity management. Rapid technological developments and a persistent desire to push the envelope of what is feasible, has characterised the intriguing evolution of HPC (Michalakes, 2020). HPC has advanced scientific research, national security, and economic competitiveness from its modest beginnings in the 1960s to the supercomputers of today (Sato et al., 2021).

Today, Harmon (2023) emphasises that the field of HPC is currently seeing significant growth and development due to the constant pursuit of computing's full potential and the unwavering pursuit of performance. A new era of scientific discovery and innovation for employees is anticipated with the arrival of exascale computing, which seeks to produce supercomputers capability of completing a quintillion calculations per second (Michalakes, 2020). Hew and Brush (2021) noted that the problem with technology acceptance is not just a lack of knowledge on how to use it, but also a lack of information and practices related to technology-based pedagogy (Rasheed et al., 2018). Many academics and industry researchers are concerned about end-user adoption intents and attitudes towards the various HDI technologies due to the growing reliance on technology (Arts et al., 2011; Kulviwat et al., 2017; Mayer & Mayer, 2023).

WOHLLEBE & ROSS

Discover publication opportunities:
www.wr-publishing.org

International Journal of Applied Research in Business and Management (ISSN: 2700-8983)
Volume: 07 Issue: 08 Year: 2026
https://doi.org/10.51137/wrp.ijarbm.595

These challenges result in many people being reluctant to implement more advanced technology such as HPC and cloud computing (Galston, 2018). The reluctant behaviour of employees in relation to the use of the HPC is based on whether the new technology will enhance an organisation's competitive advantage or improve an employee's personal or work life (McDermott, 2015). The objective of this study is to establish the determinants of employees on the adoption and continued use of high-performance computing at a selected HDI and to recommend possible mechanisms that could positively influence the integration and continued use of HPC in HDIs.

Literature Review

Theoretical Literature

Functional Attitude Theory

According to functional attitude theory, many attitudes are driven by factors other than hedonic incentives. Katz (1960) contended that a clear definition of attitudes is necessary in order to develop a robust theory of attitudes. For instance, Levin et al., (2018) discovered that there are additional forms of engagement that overlap with some of the attitude functions. Previously, dual-process models of persuasion had conceptualised involvement as dependent on positive or negative consequences. Different persuasion processes are consistently produced by these alternative forms of participation, which dual-process models are unable to explain. The efficacy of functional attitude theory as an explanatory mechanism must be demonstrated if attitude theory is to advance (Levin et al., 2018).

Theory of Planned Behaviour

This theory is relevant to this study because, as in the original theory of reasoned action, a central factor in the theory of planned behaviour is the employee's intention to perform a given behaviour (Fornell et al., 2017). Intentions are assumed to capture the motivational factors that influence a behaviour; they are indications of how hard people are willing to try, of how much of an effort they are planning to exert, to perform the behaviour (Hagger et al., 2013). As a rule, the stronger the intention to engage in a behaviour, the more likely should be its performance (Grudz et al., 2018). Meaning, if an HDI leaves the traditional way of manual work and fully integrates the use of advanced HPC technology into the day-to-day activities of employees, the intention to use HPC technology will be strong enough for employees to want to transition into it (Grudz et al., 2020).

Empirical Literature

Determinants of the Adoption and Continued Use of HPC

Attitude

WOHLLEBE & ROSS
Discover publication opportunities:
www.wr-publishing.org

International Journal of Applied Research in Business and Management (ISSN: 2700-8983)
Volume: 07 Issue: 08 Year: 2026
https://doi.org/10.51137/wrp.ijarbm.595

Attitude toward high-performance computer systems is defined as an individual's broad assessment or emotion of support or antagonism to computer technologies and detailed computer-related events (Smith et al., 2018). Statements on how employees interact with computer hardware, software, other individuals who work with computers, and computer-related activities are often included in computer systems attitude evaluations. When it comes to computer-related activities, single examples of conduct or groupings of behaviour are examined (Smith et al., 2018).

Intention

According to Haggard and Cole (2013), intention refers to the motivational elements that drive a certain behaviour, where the stronger the intention to conduct the behaviour, the more liable it will be executed. An individual goal is to employ a technology that has a direct impact on actual usage (Chassagnon et al., 2008). Individual intention is inclined by behaviour and attitude that emanates from technology (Gerrans, 2007). Fried et al. (2011) illustrate that super computers, cluster computers and cloud computing produce secure and fast outcomes which make it much easier for employees to work with, which leads to a positive intention to use high performance computing. Although much is already known about determinants of the intentions to use technology, much less is known about a crucial relationship between the intention to use it and actual usage of HPC technology (Skaalvik, 2016). Many people declare that they intend to use innovative technology, but fewer do (Venkatesh & Davis, 2017). In the context of learning a HPC in an HDI, using new technology requires an important change in behaviour. Often, a departure from the type of teaching and learning that an employee is used to and has observed in the past (Al-sa'd, 2021). This requires an orchestration of existing pedagogical competences with the novel tools, which can be accomplished in many ways (Drijvers et al., 2010). This process requires a substantial level of cognitive investment on the part of the employees who work with HPC technology (Skaalivik & Skaalivik, 2016).

Innovativeness

HPC systems enable advances in the use of Artificial Intelligence (AI) and big data technologies in our culture, so the significance of the application of HPC and innovativeness endures to upsurge (Ezell & Atkinson, 2020). Technology innovation done with the application of HPC is anticipated to offer opportunities for technology commercialisation and acquisition to tertiary institutions (Freeman, 2019). Transitions created from learning materials and experiments have altered the future of computing innovation (Hoffman, 2011). Technology is changing every single day and unless employees adapt to it, it is very unfortunate that they will be left behind (de Vries, 2014). The innovation of HPC technology is fundamental to the lives and the growth of employees in an institution because it is the kind of technology that encompasses efficiency and can reduce workload for some employees in environments like universities and schools (Dennell, 2021). At the same time technological innovativeness is suggested to

WOHLLEBE & ROSS

Discover publication opportunities:
www.wr-publishing.org

International Journal of Applied Research in Business and Management (ISSN: 2700-8983)
Volume: 07 Issue: 08 Year: 2026
https://doi.org/10.51137/wrp.ijarbm.595

increase organisational innovativeness and environmental innovativeness, which both potentially impact new product success positively (Sood et al., 2018). Accordingly, Gatignon and Xuereb (2009) found how that technologically newer products have a higher new product performance and have a way of positively impacting the use of it to employees in the sectors.

The Integration and Continued Use of HPC in HDIs

HPC in Courses

HPC, like any other fast-paced, advanced and continuously evolving computing area—is rich with several exploratory and research opportunities, which lends itself well to meeting learning outcomes of broader Project-Based Learning (PBL), such as capstone and research courses (Becker & Quille, 2023). PBL has been shown not only to help staff and students understand a subject area better, but also to provide motivation (O'Brien, 2019). PBL is common in engineering education, allowing students to apply knowledge in a self-directed manner. For example, HPC project topics have been integrated into a PDC, though not necessarily HPC, coursework for software engineering and computer systems engineering students (Freiberger et al., 2016). In this course, instructors teach the fundamentals of parallel computing, and students can then self-learn and explore a wider variety of topics not formally taught by the instructors; these topics could include HPC (Copper & Cunningham, 2019). Students subsequently relay core concepts they learned in their individual projects through oral presentations in class.

Educational Tools

Although few educational tools exist for teaching "strictly HPC" content, several do exist for fundamental concepts that are relevant to parallel computing (Blumenfeld et al., 2011). HPC provides a large collection of activities, categorised into various course and curricula views, to help instructors find relevant material for their HPC courses (Broll et al., 2019). Parallel AR uses an analogy to visualise fundamental parallel scheduling policies, focusing on concepts without requiring students to program (Chen, 2016). Also recognising the importance of visualisation, TSGL is a thread-safe graphics library that helps instructors and students visualise the underlying execution of their parallel programs (Peckham et al., 2023). Block-based programming extensions are also starting to emerge, for both parallel programming and distributed programming (Brusi et al., 2019).

Cárdenas-Moncada et al. (2020) mentioned that from the tools and education aspects, HPC programming interfaces such as Spark, Hadoop, and their software stacks are intensively utilised in data science. These parallel and distributed APIs have generally met data scientists' requirements in terms of high computational performance, while Big Data frameworks such as Spark have performed likewise in terms of high-level programming, resiliency and I/O handling (Kruchten, 2020). For less computing-intensive data science programs, plug-and-play options that require little technical intervention is needed to reach educational goals (Vavilala, 2020).

WOHLLEBE & ROSS

Discover publication opportunities:
www.wr-publishing.org

International Journal of Applied Research in Business and Management (ISSN: 2700-8983)
Volume: 07 Issue: 08 Year: 2026
https://doi.org/10.51137/wrp.ijarbm.595

Building a Professional HPC Educator Community

Chen et al. (2020) state that attracting HPC researchers with good communication skills to the HPC education community can greatly reduce the pressure on instructors and allow the content of HPC education to be updated as the state-of-the-art progresses. HPC researchers can also benefit from the HPC education community. For example, researchers can decompose the latest scientific research questions and post them (Reed & Dongama, 2017). The questions can be followed by more students worldwide and solved; research topics can attract the attention of more outstanding students all over the world, allowing their own research to expand in new ways (Saito et al., 2019). In short, we need to use the HPC education community to build a bridge between HPC researchers and students (Tom & Searcy, 2023).

Methodology

Research Questions

The study aims to investigate the determinants on the adoption and continued use and integration of high-performance computing in a historically disadvantaged institution

- What are the determinants of employees on the adoption and continued use of high-performance computing at a selected HDI?
- What mechanisms can positively influence the integration and continued use of HPC in HDIs?

Research design refers to the overall strategy utilised to carry that defines a succinct and logical plan to tackle established research question(s) through the collection, interpretation, analysis, and discussion of data (Claybaugh, 2020). This study adopted a qualitative research approach, which was exploratory and subjective in nature. The study area was based at a historically disadvantaged institution as such the University of Limpopo was the chosen area of study. Specific areas that were located for the possibility of this study were Mathematics and Physics Department, ICT department and Computer Science department with a with a population of *(n=50)*. A sample size of 12 people was reached after saturation particularly Mathematics and Physics department (10), and others from ICT (1) and Computer Science Department (1) who occupy positions as principal system scientists, researchers and technicians. These participants were selected because they had in-depth knowledge of how HPC technology works.

Ethical clearance was issues and gate-keeping permission was requested from the University Registrar and participants were located through the Head of Department in departments involved with HPC. This was then narrowed down to one department that dealt with the use of these systems specifically. Open ended, semi-structured interviews were integrated consisting of 20-45 minutes interviews with the

WOHLLEBE & ROSS
Discover publication opportunities:
www.wr-publishing.org

International Journal of Applied Research in Business and Management (ISSN: 2700-8983)
Volume: 07 Issue: 08 Year: 2026
https://doi.org/10.51137/wrp.ijarbm.595

participants. Thematic analysis and Microsoft Excel were used as a form of qualitative data analysis, classifying the data collected into manageable themes and sub-themes.

Results

RQ1 - Determinants of Employees to Adopt and Use HPC in an HDI

N	(%)	Theme
5	42%	Computer language background
2	16%	Continuous learning

Table 1: Themes on adoption and continued use of HPC

Theme 1: Computer Language Background

The nature of the participants' duties requires good computer language background in order to run experiments and read calculations or rather understand certain things that are related to HPC and programming. It would be much easier for participants to use HPC once they learn the HPC language. The extracts that support these are presented below:

Participant 3 said:

"My biggest challenge is that I do not have a background in computer science so time and again, you find that when, I have to develop certain aspects of my work that requires some sort of coding, it takes me a step or two back as I have to acclimatize and then get to work. Even if there is support, some things are too scientific and do not require system administration personnel".

Participant 9 who works as a senior researcher also added by saying:

"I do not have the background as I did not do computer science, so everything that I know was self-taught attending workshops for beginners and staff. Having to do something requires asking for assistance".

Theme 2: Continuous Learning

For employees to make use of the adoption of HPC in the daily work and in societies, they do not need to learn HPC language only but keep up with updates as technology constantly advances. Hence, the nature of the participants' job involves using the latest technology in the market. The extracts below attest to this.

WOHLLEBE & ROSS
Discover publication opportunities:
www.wr-publishing.org

International Journal of Applied Research in Business and Management (ISSN: 2700-8983)
Volume: 07 Issue: 08 Year: 2026
https://doi.org/10.51137/wrp.ijarbm.595

Participant 4 who works as a senior researcher also attested that:

"One challenge, even for people who have done computer science, is the constantly learning new computer codes, so one constantly has to check the updates".

Participant 11 also stated that:

"One always has to be update with it comes to computer codes because they are the ones you have to learn first to understand the computer language".

RQ2 - Mechanisms for Adoption and Continued Use of HPC

N	(%)	Theme
4	33%	Education, Training and Development

Table 2: Recommended mechanisms for implementing HPC in HDIs

Theme 1: Education, Training and Development

In relation to how the integration and continued use of HPC can be encouraged in HDIs, only one theme emerged, namely, education, training and development. The use of education, training and development programmes to influence the behaviour of employees to use and continue to HPC.

Participant 2 explained that:

"*Institutions of higher learning should take an initiative into integrating mandatory HPC courses as part of training and development in order to broaden the scope of employees and for them to be able to effectively use HPC in their daily work activities*".

Participant 7 stated that:

"*I form part of the outreach community; the common mistakes that schools make is that they fear letting students learn science streams or rather mathematics. They force them to do Mathematics literacy so that passing rates look much better, but quality is compromised on the science side. Automatically you cannot do computer science so we figured, we can work with the undergraduates and make them have an idea so that they move away from traditional careers like medicine and lawyers because HPC has a lot of careers".*

Participant 4 stated:

WOHLLEBE & ROSS
Discover publication opportunities:
www.wr-publishing.org

International Journal of Applied Research in Business and Management (ISSN: 2700-8983)
Volume: 07 Issue: 08 Year: 2026
https://doi.org/10.51137/wrp.ijarbm.595

"*High school is where the problem starts. How the curriculum is set is wrong because I was only exposed to HPC and had to learn the HPC language as a whole when I was doing my masters. Imagine if I had the knowledge when I was an undergraduate, it would have made a big difference. What we are currently doing together with the school of physics and minerals, we are engaging in changing the curriculum, we are targeting doing a winter school where we will take in the 3rd year who are doing what is in line with computer science which will expose them to HPC because most of them are exposed to HPC when they do their Honours because they have to choose projects".*

Discussion

Computer Language Background

Research participants emphasised the importance of having computer background when dealing with the basis of HPC because of how tricky it can get. Having foundational education and knowledge on programming and computer science serves as a good standard for learning about HPC. Most participants reported that were from the physics and it became difficult to learn coding from the beginning. Educational tools are lacking. Teaching loads are a problem for institutions. Teaching HPC courses has traditionally been the domain of one or a small number of courses, whose instructors also must manage teaching responsibilities for important departmental courses or, in the case of research, grant work and the department's overarching research initiative. Although academic HPC researchers have extensive backgrounds in HPC engineering, they frequently concentrate on their own work because they understand how important it is to produce graduates with a wide range of talents in HPC.

Participants emphasised on how constantly the programming language changes that that they must keep up with the changes, which is normally not easy. Kumar et al. (2020) attests that interdisciplinary area for non-computing majors can come across extensive. Computational science creates advanced models that require a mixture of knowledge of mathematics, computing, and domain science and engineering expertise. Many of the curriculum changes occur regularly at graduate levels where the students have the appropriate disciplinary background to understand the systems being modelled and the challenge of advancing research in their own disciplines (Theis & Wong, 2019). It is not uncommon for employees and researchers to learn important skills and techniques through less formal means, such as workshops and training sessions provided by HPC research centres (Hazzen, 2020).

Continuous Learning

The continuous advancement in technology implies that makes it is almost impossible to know everything about the new computer codes in the absence of continuous learning, making it imperative for the participants to keep up with the use of new knowledge. This implies that the participants' commitment to continuous learning contributes to employees' adoption and continued use of HPC

WOHLLEBE & ROSS
Discover publication opportunities:
www.wr-publishing.org

systems in the daily work. Studies by Cacioppo and Petty (1982) and Mussel et al. (2016) state that need for knowledge moderates the relationship between intentions and use, in such a way that when intentions to use a particular technology in a particular context are low, the effect of need for knowledge on actual use of that technology is strong. Participants emphasised on how constantly the programming language changes that that they must keep up with the changes, which is normally not easy. Kumar et al. (2020) attests that interdisciplinary area for non-computing majors can come across extensive. Computational science creates advanced models that require a mixture of knowledge of mathematics, computing, and domain science and engineering expertise. Many of the curriculum changes occur regularly at graduate levels where the students have the appropriate disciplinary background to understand the systems being modelled and the challenge of advancing research in their own disciplines (Theis & Wong, 2019). It is not uncommon for employees and researchers to learn important skills and techniques through less formal means, such as workshops and training sessions provided by HPC research centres (Hazzen, 2020).

Education, Training and Development

The participants made aware that there is a need for intervention into integrating the right education and knowledge needed for more people to learn the HPC technology and the only way is to start small. Reaching out to students from high school and those in their undergraduate will help grow the interface of more and more people being knowledgeable on the use of HPC for future years to come. Therefore, cognitive needs affect the intention to use HPC because it is important for employees to couple with the necessary cognitive skills in order to be able to use HPC in an HDI. According to research by Nazar (2008), cognitive abilities have an even greater impact on technology use intentions than personality models do. Information systems research has shown that using human variables is crucial for forecasting how people would use and adopt technology (Lucas, 1981; Nazar, 2008).

Looking into the perspectives of different participants, the researcher has concluded that exposure and an integration of certain education, training and development needs may assist people to be able to use HPC effectively and thus enjoy the benefits of HPC. If employees and people are not equipped with a certain aspect of technology, there is no fascination or eagerness to learn about. Exposure together with the right amount of knowledge can get other employees interested in integrating HPC Technology. Hence, outreaches and initiative programmes in high schools and tertiary institutions to introduce HPC and to also integrate certain modules were considered important. This supported by Shields (2020) by emphasising that some universities and many HPC centres worldwide promote broad involvement by offering some HPC curricula at undergraduate or graduate levels. There has also been steady progress in the creation of educational materials and with the formation of a community of educators that can aid future efforts. In particular, the Curriculum Development and Education Resources (CDER) center provides a detailed curriculum and parallel computing undergraduate courses (Hunter, 2019).

WOHLLEBE & ROSS

Discover publication opportunities:
www.wr-publishing.org

International Journal of Applied Research in Business and Management (ISSN: 2700-8983)
Volume: 07 Issue: 08 Year: 2026
https://doi.org/10.51137/wrp.ijarbm.595

HPC remains a challenge for both computing employees and researchers. Staff recruitment for HPC courses is a major problem in this field. Employees need to be convinced that the HPC field is important enough to justify taking on extra credit hours in their already challenging programs because of the rapid development of HPC technologies and the limited availability training and developmental tools, the average employee lacks the vision and HPC knowledge to learn and teach on HPC for both students and to employees, but more will be able to do so if course materials are provided and readily available for use in an average lab. This study was not exempt from the flaws that the literature suggests are inherent to qualitative research. This study was only limited to employees who worked or had knowledge of HPC systems, which were people from the material modelling centre and only two individuals outside the centre, one being in the school of accounting and one at ICT.

Conclusion

In this study, the perceptions and experiences of employees on the adoption and continued use of HPC in an HDI were investigated. The research findings showed that employees have different perceptions and experiences with regards to the adoption and continued use of HPC, both positive and negative. The next technological revolution, Industry 5.0, may catch people off guard if the rate of change in technology accelerates from a gradual, adaptive pace to a more transformative pace. Employee skills and some positions may become obsolete because of this technological disruption. Organisations contemplating investments in further automation of HPC technology possess a chance to capitalise on employees' mind sets and anticipate possible disruptions in the workforce.

Practical Recommendations

Educational programs are strongly encouraged to develop a set of competencies needed for their programs to enable high performance computing education. Recent efforts in the academic community have proposed competencies as a core set of knowledge, skills, and dispositions that need to be attained. While many programs focus on the knowledge and skills alone, the dispositions that prescribe a requisite character or quality in task performance are very much lacking in the specification of academic programs. Programs need to be alerted to providing students with an experiential environment for students to immerse themselves in a hands-on setting.

Theoretical Implications and Future Research

The greater adoption of HPC systems by the scientific community will raise the prospect of establishing coursework in the subject, which is currently limited to electives in computer science in a handful of universities, with one well-known postgraduate level degree at the University of Edinburgh, although there is continuing research journals and conferences on the subject, with strong industry support. Whilst the lack of coursework may seem to be a surprising result for what is the provision of the world's most

WOHLLEBE & ROSS
Discover publication opportunities:
www.wr-publishing.org

powerful computer systems, it is an understandable result when viewed as a highly specialised sub-discipline.

To be more precise, the study suggests that organisations should comprehend how anticipated developments in HPC technology could affect workers in various departments. The organisations and institutions should develop a change management and communication strategy that capitalises on the employees' present perspective of the future after the future state has been established. In conclusion, it is critical for employers to ensure that HPC benefit employees' learning outcomes and to provide more excellent HDI techniques for greater success. This can be achieved by understanding the strong determinants of employees' behaviour to use HPC to positively influence employees' adoption and continued use of HPC. It is encouraged that for future research, studies on how educational courses can be integrated as means to assist employees to acquire a set skill that will assist in navigating technology such as high-performance computing should be looked into as part of research means.

References

Appleton, O. (2013). *Business models for federated infrastructures*. http://www.efiscal.eu/files/presentations/amsterdam/BizModels-eFISCAL.pdf

Arts, J. W., Frambach, R. T., & Bijmolt, T. H. (2011). Generalizations on consumer innovation adoption: A meta-analysis on drivers of intention and behaviour. *International Journal of Research in Marketing, 28*(2), 134–144.

Bandalos, D. L., & Finney, S. J. (2019). Item parcelling issues in structural equation modelling. In G. A. Marcoulides & R. E. Schumaker (Eds.), *New developments and techniques in structural equation modelling* (pp. 269–296).

Becker, B. A., & Quille, K. (2023). A review of the evolution of introductory programming education research. *Proceedings of the Association for Computing Machinery*, 338–344. https://doi.org/10.1145/3287324.3287432

Broll, B., Lédeczi, A., Zare, A., Nguyen Do, D., Sallai, J., & Vanags, C. (2019). A visual programming environment for introducing distributed computing to secondary education. *Journal of Parallel and Distributed Computing, 118*, 189–200.

Cacioppo, J. T., & Petty, R. E. (1982). The need for cognition. *Journal of Personality and Social Psychology, 42*, 116–131.

Chassagnon, S., Minotti, L., Kremer, S., Hoffmann, D., & Kahane, P. (2008). Somatosensory, motor, and reaching/grasping responses to direct electrical stimulation of the human cingulate motor areas. *Journal of Neurosurgery, 109*, 593–604.

Chen, J., Lee, S., Crooks, S., & Song, J. (2012). An investigation of mobile learning readiness in higher education based on the theory of planned behaviour. *Computers & Education, 59*, 1054–1064.

Claybaugh, Z. (2020). *Organizing academic research papers: Types of research designs*. https://library.sacredheart.edu

Edison, H., Ali, N. B., & Torkar, R. (2018). Towards innovation measurement in the software industry. *Journal of Systems and Software, 86*(5), 1390–1407.

Eickholt, J., & Shrestha, S. (2020). Teaching big data and cloud computing with a physical cluster. In *Proceedings of the 2017 ACM SIGCSE Technical Symposium on Computer Science Education* (pp. 177–181).

Ezell, S. J., & Atkinson, R. D. (2020). *The vital importance of high-performance computing to US competitiveness*. Information Technology and Innovation Foundation.

Ferlie, E., Musselin, C., & Andresani, G. (2021). The steering of higher education systems: A public management perspective. *Higher Education, 56*(3), 325–348.

Fornell, C., & Larcker, D. F. (2017). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research, 48*, 39–50.

Freeman, L. C. (2019). Centrality in social networks: Conceptual clarification. *Social Networks, 1*, 215–239.

Fried, I., Katz, A., McCarthy, G., Sass, K. J., Williamson, P., Spencer, S. S., & Spencer, D. D. (2011). Functional organisation of human supplementary motor cortex studied by electrical stimulation. *Journal of Neuroscience, 11*, 3656–3666.

Galston, W. A. (2018). Countering tech's damaging effect on jobs. *The Wall Street Journal*. http://www.wsj.com/articles/william-galston-countering-techs-damaging-effect-on-jobs-1413328435

Gatignon, H., & Xuereb, J. M. (1997). Strategic orientation of the firm and new product performance. *Journal of Marketing Research, 34*(1), 77–90.

Gerrans, P. (2007). Mental time travel, somatic markers and "myopia for the future." *Synthese, 159*(3), 459–474.

Haggard, P., & Cole, J. (2013). Intention, attention and the temporal experience of action. *Consciousness and Cognition, 16*(2), 211–220.

Harmon, A. (2023). *HPC matters: Funding, collaboration, innovation*. https://sciencenode.org/feature/hpc-matters-funding-collaboration-innovation.php

WOHLLEBE & ROSS

Discover publication opportunities:
www.wr-publishing.org

Hew, K. F., & Brush, T. (2021). Integrating technology into K–12 teaching and learning: Current knowledge gaps and recommendations for future research. *Educational Technology Research and Development, 55*, 223–253.

Hoffman, B., & Nadelson, L. (2020). Motivational engagement and video gaming: A mixed methods study. *Educational Technology Research and Development, 58*, 245–270.

Ibukun, E., & Daramola, O. (2019). A systematic literature review of mobile cloud computing. *International Journal of Multimedia and Ubiquitous Engineering, 10*(12), 135–152.

Katz, D., Sarnoff, I., & McClintock, C. (1956). Ego-defence and attitude change. *Human Relations, 9*, 27–45.

Kumar, G., Ajay, V., & Yang, Y. (2020). *COVID-19 Twitter dataset with latent topics, sentiments and emotions attributes*. https://arxiv.org/abs/2007.06954

Manyika, J., & Chui, M. (2020). *A future that works: Automation, employment and productivity* (pp. 58–60).

McDermott, M. S., et al. (2015). The theory of planned behaviour and discrete food choices: A systematic review and meta-analysis. *International Journal of Behavioral Nutrition and Physical Activity, 12*(1), 162. https://doi.org/10.1186/s12966-015-0324-z

Michalakes, J. (2020). HPC for weather forecasting. In A. Grama & A. H. Sameh (Eds.), *Parallel algorithms in computational science and engineering* (pp. 297–323).

Mussel, P., Ulrich, N., Allen, J. J. B., Osinsky, R., & Hewig, J. (2016). Patterns of theta oscillation reflect the neural basis of individual differences in epistemic motivation. https://doi.org/10.1038/srep29245

Nazar, R. (2008). Cognitive vs personality of the intention to use internet technology. *Accountability Journal*, 86–93.

Rasheed, F., & Wahid, A. (2018). The theory of differentiated instruction and its applicability: An e-learning perspective. *VSRD International Journal of Technical & Non-Technical Research, 9*, 193–201.

Roberts, T. (2023). *Appropriating technology*. http://appropriatingtechnology.org/?q=node/296

Saito, M., Kodama, Y., Tsuji, M., & Odajima, T. (2021). Co-design and system for the supercomputer “Fugaku.” *IEEE Micro, 42*, 26–34.

Sánchez, R. A., & Hueros, A. D. (2010). Motivational factors that influence the acceptance of Moodle using TAM. *Computers in Human Behavior, 26*(6), 1632–1640.

WOHLLEBE & ROSS

Discover publication opportunities:
www.wr-publishing.org

Sánchez, T., Gilar-Corbi, R., Castejón, J. L., Vidal, J., & León, J. (2020). Students' evaluation of teaching and their academic achievement. *Frontiers in Psychology, 11*, 1–10. https://doi.org/10.3389/fpsyg.2020.00233

Scott, K. (2022). *Automation may take jobs—but AI will create them*. https://www.wired.com/story/automation-may-take-jobs-but-ai-will-create-them/

Skaalvik, E. M., & Skaalvik, S. (2016). Teacher stress and teacher self-efficacy as predictors of engagement and motivation. *Social Psychology of Education*, 1785–1799.

Smith, W., Anderson, P., Gatignon, H., & Tushman, M. L. (2021). A structural approach to assessing innovation. *Management Science, 48*(9), 1103–1122.

Sood, A., James, G. M., & Tellis, G. J. (2015). Functional regression: A model for predicting market penetration. *Marketing Science, 28*(1), 36–51.

Sumak, B., Hericko, M., Pusnik, M., & Polancic, G. (2011). Factors affecting acceptance and use of Moodle. *Informatica, 35*, 91–100.

Theis, R., & Wong, T. (2017). The end of Moore's law: A new beginning for IT. *Computing in Science & Engineering, 19*(2), 30–32.

Vavilala, V. S. (2020). Combining high-performance hardware and deep learning frameworks. *European Journal of Physics, 41*, 035802. https://doi.org/10.1088/1361-6404/ab702

WOHLLEBE & ROSS

Discover publication opportunities:
www.wr-publishing.org