Research Statement

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Background

In the contemporary educational and technological landscape, the intersection of data science and learning represents a critical frontier. My research delves into Learning Analytics, leveraging computational tools and rich data environments to enhance educational outcomes. This work is pivotal in harnessing the detailed data generated within learning contexts to refine classroom interactions and personalize education. Concurrently, the digital transformation wave has ushered in a demand for expertise in Data Science and Cloud Computing, creating an impetus for educational institutions to align curricula with the evolving job market. My efforts in Jobs, Skills, and Curriculum Analytics are instrumental in updating academic programs and aiding businesses in identifying essential skills, ensuring graduates are industry-ready. With the ubiquity of social media, my research in Social Media Analytics transcends commercial consumer analytics, extending to the analysis of public sentiment on critical societal issues, thus informing public policy and enhancing community well-being. Lastly, my work in the burgeoning field of the Metaverse and XR (Extended Reality) not only aligns with the explosive growth in market demand but also signifies a transformative approach to immersive learning and professional practice in education, healthcare, and e-commerce. The implications of this research are vast, influencing educators, learners, industry stakeholders, policymakers, and the broader society, as it offers innovative solutions and advancements in technology adoption and integration.

Research Areas

1. Learning Analytics

Learning analytics is an area of **research** and **practice** where **computational analysis methods and tools** meet data about **learners** and their **learning contexts**. Classrooms can generate a lot of high granularity data about how our students learn. My Education Technology (EdTech) research investigates innovative use of learning tools and analysis methods *(text mining and social network analysis)* to improve classroom teaching and learning.

2. Jobs, Skills, and Curriculum Analytics

In recent years, many organizations around the world are ramping up their digital transformation efforts to meet changing market needs. With increasing data volume and adoption of technologies including machine learning and artificial intelligence across all industries, the demand for skilled Data Science and Cloud Computing professionals is continuing to increase globally. For educational institutions to teach the most up-to-date and industry-relevant skills and for businesses to hire employees with the right set of skills, it is important for them to stay tuned to the fast-changing dynamics of job landscape. Over the last few years, I have actively collaborated with

SMU SCIS' curriculum committee members on automating jobs and skills analyses using text mining and social network analysis techniques.

3. <u>Social Media Analytics</u>

With the global social media penetration rate nearing 60% as of 2022, businesses in all industries have recognized the importance of social media analytics. Social media analytics can reveal useful insights on what content and engagement methods drive more user acceptance. To governments, social media analytics can provide timely insights about their citizens' public sentiment towards public policies *(e.g. COVID lockdown)*. In the last few years, my social media analytics researched has focused on 1) consumer analytics *(innovative technology-enabled home appliances)* and 2) public health *(COVID-19, mental well-being)*.

4. <u>Metaverse/XR Research</u>

In the last few years, major tech giants around the world have been ramping up their efforts in **metaverse** and **XR technologies**. The global metaverse/XR market size is expected to reach over 800 billion USD by 2028. Edge computing, 5G, and decreasing prices of XR hardware will lead to a wider adoption of XR devices and applications in all sectors including education institutions. Already, institutions in the UK and the USA are experimenting with XR technologies for immersive and improved learning experience for learners. At SMU, I lead a research and development group focused on Metaverse and Extended Reality (XR) application development in the areas of **education**, **healthcare**, and **e-commerce**.

Selected Publications and Outputs

K. J. Shim, T. Menkhoff, L. Y. Q. Teo, C. S. Q. Ong. "Assessing the effectiveness of a chatbot workshop as experiential teaching and learning tool to engage undergraduate students," Educ Inf Technol 28, 16065–16088 (2023).

M. Thulasidas, **K. J. Shim**, J. Teo. "Peer Learning in an Undergraduate Linear Algebra Course - A Social Network Analysis," 2023 IEEE International Conference on Teaching, Assessment, and Learning for Engineering (TALE 2023).

S. Gottipati, **K. J. Shim**, V. Shankararaman. "Exploring Students' Adoption of ChatGPT as a Mentor for Undergraduate Computing Projects: PLS-SEM Analysis," International Conference on Computers in Education (ICCE 2023).

S. Gottipati, **K. J. Shim**, V. Shankararaman. "AI for Connectivism Learning - Undergraduate Students' Experiences of ChatGPT in Advanced Programming Courses," Americas Conference on Information Systems (AMCIS 2023).

E. L. Ouh, B. K. S. Gan, **K. J. Shim**, S. Wlodkowski. "ChatGPT, can you generate solutions for my coding exercises? An evaluation on its effectiveness in an undergraduate Java programming course," 28th annual ACM conference on Innovation and Technology in Computer Science Education (ITiCSE 2023).

S. Gottipati, **K. J. Shim**, S. Datta. "Career Track Based Capstone Course Design for Information Systems Curriculum," IEEE Global Engineering Education Conference (EDUCON 2023).

S. Pang, **K. J. Shim**, Y. M. Lau, S. Gottipati. "VR computing lab: An immersive classroom for computing learning," 2022 IEEE International Conference on Teaching, Assessment, and Learning for Engineering (TALE 2022).

L. K. Shar, C. M. Poskitt, **K. J. Shim**, L. Y. L. Wong. "XSS for the Masses: Integrating Security in a Web Programming Course using a Security Scanner," 27th Annual Conference on Innovation and Technology in Computer Science Education (ITiCSE 2022).

K. J. Shim, S. Gottipati, V. Shankararaman. "Coders Assembly – Peer Assisted Learning Model for Freshman Programming Courses," IEEE Global Engineering Education Conference (EDUCON 2022).

K. J. Shim, S. L. Lo, S. Y. Liew. "Do Sequels Outperform or Disappoint? Insights from an Analysis of Amazon Echo Consumer Reviews," 2022 Hawaii International Conference on System Sciences (HICSS-55).

C. M. Poskitt, **K. J. Shim**, Y. M. Lau, H. S. Ong. "Mind the Gap: Reimagining an Interactive Programming Course for the Synchronous Hybrid Classroom," 2022 Hawaii International Conference on System Sciences (HICSS-55).

K. J. Shim, S. Gottipati, Y. M. Lau. "Flip & Slack – Active Flipped Classroom Learning with Collaborative Slack Interactions," International Conference on Computers in Education (ICCE 2021).

D. L. Ong, **K. J. Shim**, S. Gottipati. "Profiling Student Learning from Q&A Interactions in Online Discussion Forums," International Conference on Computers in Education (ICCE 2021).

K. J. Shim, S. Gottipati, Y. M. Lau. "Integrated Framework for Developing Instructional Videos for Foundational Computing Courses," Pacific Asia Conference on Information Systems (PACIS 2021).

R. Barros, S. Gottipati, **K. J. Shim**. "Mining Informal and Short Weekly Student Self-Reflections for Improving Student Learning Experience," Americas Conference on Information Systems (AMCIS 2021).

K. J. Shim, S. Gottipati, Y. M. Lau. "Integration of Professional Certifications with Information Systems Business Analytics Track Curriculum," IEEE Global Engineering Education Conference (EDUCON 2021).

S. Gottipati, V. Shankararaman, **K. J. Shim**, C. Y. Yip. "Information systems business analytics curriculum: Competencies from National Infocomm skills model and job listings," Americas Conference on Information Systems (AMCIS 2021).