Research Statement

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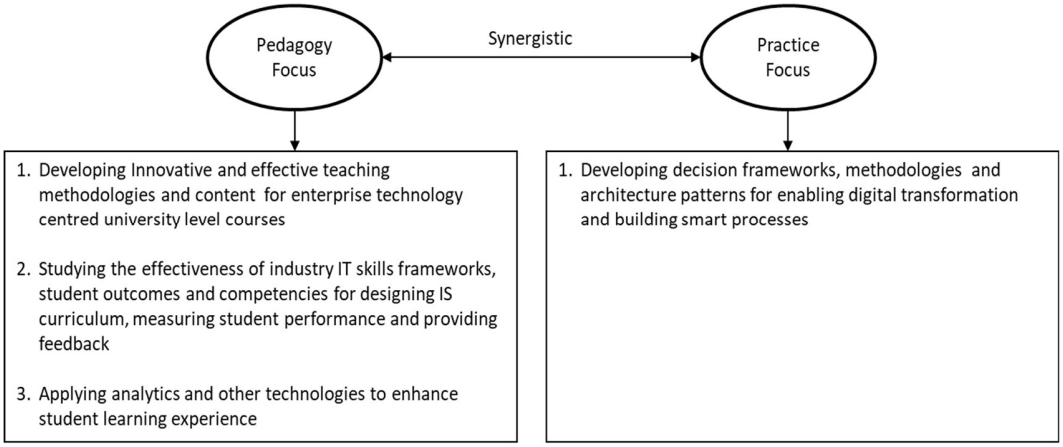
Background

At SMU, I have been actively involved in pedagogy and practice research. I have established a synergistic relationship between the pedagogy focused and practice focused research. The following diagram shows the key areas of my work and the concerns that I have been addressing.



Research Areas

Pedagogy Focused Work

1. Developing Innovative and effective teaching methodologies and content for enterprise systems technology centred university level courses

Enterprise systems design, implementation, and integration play a major role in automating and innovating business processes. However, teaching these concepts to undergraduate students is quite challenging due to lack of complied content and the complexity of the tools. Over the last ten years, I have been experimenting with various approaches to develop both the content and methodologies for delivering courses that are focused on enterprise technology. Following are some examples of this theme of my research work.

2. Studying the effectiveness of industry IT skills frameworks, student outcomes and competencies for designing IS curriculum, measuring student performance and providing feedback

I got interested in this area of work when I started to explore ways to improve student learning and provide better feedback to the students in my course. As the Associate Dean of Education, it was also my responsibility to drive continuous improvement and renewal of the SIS BSc (ISM) curriculum. In this context, I collaborated with SIS faculty Swapna Gottipati and SIS Senior Instructor Ms Joelle Ducrot This work has two themes.

The work is directed towards investigating how course competencies can be used to effectively deliver and assess course content, and give valuable, timely feedback to students. The Course Life Cycle and Competency Framework is developed, which addresses the following five phases of a course, namely, content design, assessment design, content delivery and assessment, assessment feedback, and content review. The framework is implemented and evaluated in some SIS courses.

3. Applying analytics and other technologies to enhance student learning experience.

This research work addresses three themes namely use of analytics in understanding and analysing curriculum and course design, application of analytics techniques to enhance analysis of student feedback and application of technology for capturing and analysing live discussions during a class session.

Following are more details on specific projects related to the three themes:

Curriculum Analytics
Curriculum analysis unpacks the three education components namely the intended outcomes, content and the learning activities, with a purpose to evaluate how the individual components fit together in terms of consistency and alignment. The aim is to analyse the strengths and weaknesses of the curricula in terms of these three components. A useful outcome of this research is a generic curriculum analytics framework that provides guidance for understanding key dimensions to be considered when applying analytics in curriculum analysis and evaluation. The framework has been applied to the Information Systems curriculum to improve the curriculum design. An automated tool was developed to allow analysis of the Information System curriculum. Based on this research work, I have successfully delivered key notes and tutorials in various education conferences. This research work has been conducted in collaboration with Prof Swapna Gottipati.

Student Feedback Analysis
Universities collect qualitative and quantitative feedback from students upon course completion, in order to improve course quality and students' learning experience. Combining program-wide and module-specific questions, universities collect feedback from students on three main aspects of a course namely, teaching style, content and learning experience. The feedback is collected through both qualitative comments and quantitative scores. Current methods for analysing the student course evaluations are manual and focus more on quantitative feedback and fall short of an in-depth exploration of qualitative feedback. In this research work, we developed a framework for capturing and analysing student feedback through use of text analytics and opinion mining

approaches to provide instructors a visual dashboard for better analysis of the qualitative feedback from students. This provided the opportunity for analysing, evaluating, discovering gaps and recommendations to improve teaching and learning process. A student feedback analytics tool has been developed that can act as a useful guide for understanding qualitative teaching evaluation feedback from the students. This research work has been conducted in collaboration with Prof Swapna Gottipati and Ms Sandy Gan (SMU Centre for Teaching Excellence).

LiveClass: Live Discussion Capture and Analysis

Uniquely among tertiary institutions in Singapore, SMU's pedagogy is based on creating an active, interactive, participative environment in small classrooms and seminar rooms. This emphasis has led to SMU's graduates becoming very good communicators, who are able to participate and lead discussions in multi-cultural group settings, an ability highly valued by employers in Singapore. Critical to fostering student participation in classroom exercises, and making it effective, is the assessment of, and ability to give feedback on, student contributions on an on-going basis. There is wide variance in how this is done across courses at SMU, with a variety of rubrics and high variance in the attention to granular detail in the collection and assessment of the quality and quantity of participation. This research project is aimed at developing a mobile phone based tool that has the potential to bring the latest developments in voice-text conversion, and text analysis as an aid to faculty in this process. Our tool is based on a mobile phone application, which will simultaneously record, on a continuous basis, every word spoken in a classroom discussion. We use voice-text conversion and then text analysis, and complement this with higher order algorithms that will be programmed to assess qualitative and quantitative aspects of individual contributions to the discussion. This research work has been conducted in collaboration with Prof Swapna Gottipati and Prof Seshan Ramaswami (Lee Kong Chian School of Business).

Practice Focused Work

1. Developing decision frameworks, methodologies and architecture patterns for enabling digital transformation and building smart processes.

Organizations can develop competitive edge through exploitation of digital technologies namely cloud computing, big data and analytics, mobile networks, social media, artificial intelligence, blockchain and the Internet of Things. By effectively leveraging these technologies they can go beyond boosting efficiency and drive new business models, develop new revenue streams, or drive other material changes that lead to an increase in the top or bottom lines. However, in order to do this, organizations must redesign their existing enterprise architecture and enterprise systems to make them more agile and develop smart processes that leverage the emerging technologies. The next generation of enterprise solution focus is on developing process platforms where parts of business processes are available as "services" and organizations can compose their processes by using the "services" as building blocks. Instead of having to write low-level code, the composition of services is achieved through a graphical user interface with drag-and-drop mechanism.

I am currently working on practice oriented research work that will investigate how to develop composite applications and smart processes using the enterprise services. In this context, I am currently working on practice research along the following themes

1. A methodical approach to transform current processes to "Digital Business Processes".

2. The architecture, use cases, challenges and benefits for enabling the execution of business transactions by leveraging real-time analytics.

Selected Publications and Outputs

1	TopicSummary: A tool for analyzing class discussion forums using topic based summarizations, by GOTTIPATI, Swapna; SHANKARARAMAN, Venky; RAMESH, Renjini. (2019.0). Proceedings of 49th Annual Frontiers in Education Conference, Cincinnati, US: (Published)
2	Cognitive and social interaction analysis in graduate discussion forums, by NITIN, Mallika Gokran; GOTTIPATI, Swapna; SHANKARARAMAN, Venky. (2019.0). Proceedings of 49th Annual Frontiers in Education Conference, Cincinnati, US: (Published)
3	Clustering models for topic analysis in graduate discussion forums, by NITIN, Gokarn Mallika; GOTTIPATI, Swapna; SHANKARARAMAN, Venky. (2019.0). Proceedings of the 27th International Conference on Computers in Education, Taiwan: Asia-Pacific Society for Computers in Education, Kenting, Taiwan: APSCE. (Published)
4	SMU Teaching Bank: Case Study of a Multiyear Development Project Utilizing Student Resources; Alan Megargel, Terence Fan Ping-Ching, Venky Shankararaman; 2019; AIS SIGED 2019 Conference, Munich, Germany. AIS. **(Best Paper Award)**
5	A decision framework for decentralised control of distributed processes: Is blockchain the only solution? GRIFFIN, Paul; MEGARGEL, Alan; SHANKARARAMAN. 2019. In: Handbook of Research on Blockchain Architecture, Strategy, and Business. Value ISBN: 1522592571, pp1-27, IGI Global, USA.
6	SOA maturity influence on digital banking transformation, by MEGARGEL, Alan; SHANKARARAMAN, Venky; FAN, Terence P. C. (2018).IDRBT Journal of Banking Technology (IJBT), 2(2), 1-27.
7	Text analytics approach to extract course improvement suggestions from students' feedback, by GOTTIPATI, Swapna; SHANKARARAMAN, Venky; LIN, Jeff Rongsheng. (2018). Research and Practice in Technology Enhanced Learning, 13(6), 1-19.
8	Competency analytics tool: Analyzing curriculum using course competencies, by GOTTIPATI, Swapna; SHANKARARAMAN, Venky. (2018). Education and Information Technologies, 23 (1), 41-60.
9	Real-time inbound marketing: A use case for digital banking, by MEGARGEL, Alan; SHANKARARAMAN Venky; REDDY, Srinivas K. (2018). In David Lee & Robert H. Deng (Ed.), Handbook of blockchain, digital finance, and inclusion: Cryptocurrency, FinTech, InsurTech, and regulation (pp. 311-328) San Diego, CA: Academic Press.