

The Proceedings of the 21st SAP Academic Community Conference: New Frontiers in Enterprise Systems Research and Practice

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The SAP Academic Community Conference is the annual conference created exclusively for faculty in the SAP University Alliances network. It brings together SAP thought leaders, industry experts, researchers and educators from universities around the world. The event is inspired by and shares SAP's strategic direction. It showcases opportunities to leverage SAP solutions and SAP University Alliances offerings to enhance students' academic and career outcomes.

Review Process: Abstracts were blind-reviewed by at least three independent reviewers and judged on their contribution to the field of Enterprise Systems and the SAP Academic Community. Abstracts were either accepted or rejected. The authors of accepted abstracts were required to address reviewer comments in the final version. Authors of accepted abstracts were asked to prepare an extended abstract for the proceedings. All authors were permitted to make final revisions to their extended abstracts for these proceedings. The conference also featured Technology, Research, Education and Design (TRED) talks. TRED submissions were editorially reviewed and are included in the proceedings.

CONFERENCE ORGANIZED BY:



Foreword

SAP technology in the classroom provides a breadth of options to prepare our students for academic and real-world career success. Since the founding of University Alliances, the SAP adoption at academic institutions as a teaching tool has grown exponentially. Moreover, given the organic growth (such as SAP HANA) and acquisitions (such as Ariba, SuccessFactors, and most recently Signavio), the availability for and opportunities SAP use in the classroom have also gone up significantly. However, it also means that the learning curve is much more complex than when SAP ECC was introduced. Thus, innovations in pedagogy have never been more important in information technology education.

It is against this backdrop that we conducted the 21st SAP Academic Community Conference. The theme of the conference was “New Frontiers in Enterprise Systems Research and Practice.” The main goal of this conference is to provide a forum for faculty to share innovative approaches to inspire others and provide high-value networking opportunities. After the review process, the conference saw many engaging, rigorous, and relevant submissions. They are summarized below. In the spirit of collaboration, our conference registrants also have the opportunity to attend a joint session with our colleagues in [Europe](#). We also utilized an innovative online social networking tool named [Gathertown](#). It allowed us to build a metaverse where people could engage in meaningful interaction and networking despite the restrictions posed by the Coronavirus pandemic.

Building on the tradition of developing innovative teaching materials, the five submissions presented at this year’s conference reflect the rapid pace of change the enterprise systems have undergone. Kathie Wright, Yvonne Antonucci, and colleagues show how to integrate Mendix “Low-Code” App Development program into an introductory MIS class. Jeannie Pridmore, Joy Godin, and Richelle DaSouza demonstrate the possibility of using SAP technologies to strive for the UN’s Sustainable Development Goals (SDGs). Emil Boasson and Steve Tracy adapt the ERPsim Manufacturing extended simulation to an online environment and expounds on the challenges of running a large-scale online simulation successfully. Meagan Luttenton-Knoll and colleagues focus on incorporating ethical reasoning into MIS courses with a technique that stimulates critical thinking. Their work is an important step towards fulfilling current AACSB requirements of ethics in business education. Finally, Lorraine Gardiner and colleagues demonstrate a curriculum that sensitizes students to segregation of duties through a role-playing case. Their case leverages SAP S/4HANA’s strong internal controls through the use of user roles, profiles, and authorizations.

In addition, we have fourteen TRED talks. TRED talks varied across current and important topics such as Design Thinking, social justice, project management, data analytics, enterprise architecture, and many more. We invite you to explore these topics. We hope the SAP UA Academic Conference’s showcasing of the state-of-the-art research in enterprise systems will inspire our community to continue developing and sharing innovative curriculum.

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Mendix "Low-Code" App Development: Analysis of Computer Self-Efficacy Beliefs in an Introductory MIS Course

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Abstract

No-code, low-code application development continues to gain market share and acceptance as a premier application development platform for business users. Mendix is one such app development system with an SAP partnership. This paper presents the results from a pilot study evaluating the use of Mendix within an introductory MIS course of a business school. The results indicate that Mendix can be used to help students understand complex technology concepts, providing SAP University Alliance educators a method to enhance both teaching and research. Computer self-efficacy measures and an adaptation of the revised Bloom's taxonomy were used to identify whether low-code app development within a business MIS course promotes student self-efficacy when learning complex technology topics. Session takeaways will focus on pilot study results.

Keywords: low-code applications, software development, computer self-efficacy, learning outcomes

Introduction

Technologies are constantly evolving and occasionally re-emerging in recombinant and novel forms. This research examines one such technology, model driven development (MDD), which is an expansion of the Computer Aided Systems Engineering (CASE) tools developed three decades ago. Often characterized as "low-code, no-code" application development platforms, MDD tools aim to create "citizen developers" by leveraging knowledge worker understanding of business processes. Standard business process modeling notation and team process support promote the collaboration of functional business employees with IT staff to increase developer productivity, improve software quality while reducing developer backlogs and maintenance costs, and increase customer satisfaction (Henkel and Stirna 2010).

Prior to the COVID-19 pandemic an industry analysis of MDD platforms usage across organizations projected significant growth in this software development sector (Gartner 2021). Several providers have added MDD development platforms to augment existing services, including SAP Business Process Intelligence in an effort to advance business transformation (SAP 2021). SAP also designated the independent software vendor Mendix, a recognized low-code platform leader, as a strategic partner for low-code development in 2018. Mendix immediately delivered configurable HANA connectors and SAP application design templates that can be quickly turned into Fiori compliant mobile apps.

Thus, it is likely that current business students will graduate into an environment where they will need to be familiar with the MDD approach, understand the role of MDD tools, and feel comfortable using such tools in collaborative development projects. This research presents the results from a pilot study where an introductory case, "Free as a Bird" (FaaB), using the Mendix MDD platform was deployed within an introductory Management Information Systems (MIS) course of a business school. The purpose is to identify whether low-code app development within a business MIS course promotes student self-efficacy of learning complex technology topics.

Background

The FaaB case was designed to expose students to MDD while simultaneously connecting data maintained as worksheet flat files to a relational data model. The entire case utilizes a sophisticated mechanism to parse spreadsheet tables, automatically creating entity associations and user views in the form of application pages. The resulting app is responsive and can be viewed across devices. Because the technical requirements are abstracted, the exercise rapidly moves through the introduction of theoretical concepts such as database relationships, data persistence, application program interface (API) integration and usability.

A pilot implementation of FaaB was conducted in an introductory MIS course during spring 2020. To understand the learning process, an exploratory framework was adopted utilizing constructs from general and computer-specific self-efficacy measures (Compeau and Higgins, 1995; Correia et al. 2016; Johnson and Marakas 2000; Karsten et al. 2012; Kher et al. 2013; Marakas et al. 2007; Marakas et al. 1998) and the revised Bloom's taxonomy (Anderson and Krathwohl 2000). A low-code application development self-efficacy survey was developed based on several studies that evaluate technology learning (Eder et al. 2019; Charland et al. 2015; Labonte-LeMoine et al. 2017). Using a 10-point Likert scale, students were asked questions about their knowledge of application development before and after deployment of FaaB. The adapted model includes five of the six learning levels in Anderson and Krathwohl's (2000) revised model from Bloom's Taxonomy that were characterized based on demonstrated levels of app development knowledge (Table 1).

Learning Objective	Application of Low-Code App development Knowledge	Assessment
1. Remember <i>Recall and recognition of information</i>		Students can use their Low-code application development knowledge to understand and explain concepts I believe I could... ...Explain how data is connected in application development. ... Explain what responsive views are. ... Identify data relationships needed for appropriate application development. ... Identify appropriate data types needed in an application. ... Explain the benefits of low-code development to an end user.
2. Understand <i>Interpreting, summarizing, inferring, comparing, explaining</i>	Low-Code application basic skills	Students can develop basic pages and connect data. I believe I could... ... Develop initial pages of an application. ... Develop a domain model for the application with appropriate relationships. ... Change appropriate data types in the domain model. ... Resolve errors in the application development. ... Add values to an enumerated field.
3. Apply <i>Executing, implementing procedures</i>	Low-Code application applied skills	
4. Analyze	Problem-solving/	

<i>Discovery of relationships, differentiating, organizing, attributing</i>	Decision-making	Students can use, interpret, and evaluate data and errors to fix and enhance application usability I believe I could... ... Identify data relationship issues (referential integrity). ... Identify data requiring modification to support application functionality. ... Evaluate User Interface consistency. ... Assess the functionality (usability) of the application. ... Conduct tasks related to meaningful evaluation of the application.
5. Evaluate <i>Making judgements based on criteria, checking, critiquing</i>		
6. Create <i>Plan, produce new original ideas, products</i>	<i>Not evaluated</i>	

Table 1: Alignment of Revised Bloom's Taxonomy with Levels of Low-code development Self-Efficacy Assessments (adapted from Anderson and Krathwohl, 2000; Labonte-LeMoyne et al., 2017; Eder et al., 2019)

Research Analysis

From a total of 39 survey responses, 32 surveys were completed for the purposes of this pilot study. Most of the respondents were sophomores (61%), identified as male (65%), had no prior application development experience (89%) and no prior use of programming (65%), however 62% of the respondents indicated they had taken a programming course. All respondents felt their computer skill level was average with 74% indicating they had beginner level programming skills. Regarding differences in respondents' low-code application development self-efficacy, a Kruskal-Wallis test revealed there were no significant differences in gender for both the pre-test and post-test. Similarly, there were no significant differences in respondents who had taken prior programming courses with those who had no prior programming courses except for one question in the pre-test indicating respondents who had prior programming courses had a higher belief of resolving errors before the app development but interestingly this was not the case after developing the app ($U = 87.0, p = .013$).

The analysis of low-code development self-efficacy revealed a significant difference between all 15 questions, indicating there was a difference between the respondent's self-efficacy before and after they completed the low-code application development assignment. The internal consistency among the questions was high for both the pre- ($\alpha = .987$) and post-test ($\alpha = .992$) and communalities analysis indicated a shared variance. A factor analysis was found to account for a good amount of variance in both the pre- ($KMO=.855$) and post-test ($KMO=.853$). With factor analysis being suitable, a component matrix resulted in one factor, validating all 15 items as a measure of low-code development self-efficacy. The Wilcoxon signed-rank test was used to compare paired low-code app development self-efficacy from the pre and post surveys in support of the hypotheses. The results indicate a significant difference between all 15 items of respondent's self-efficacy before and after they completed the FaaB assignment with the majority of responses in the post survey indicating a higher confidence. Similarly, the combined Bloom's categories of low-code self-efficacy are significantly different between the pre and post surveys, with higher self-efficacy for the three Blooms learning outcome knowledge categories after deploying the FaaB case.

Low-Code Application Development Self-Efficacy Pre and Post Questions	Asymp. Sig. (2-tailed)	Blooms Asymp. Sig. (2-tailed)
Posto1- Pre01 ...Explain how data is connected in application development.	.008	
Posto2 - Pre02 ...Explain what responsive views are.	.000	<i>Basic</i>
Posto3 - Pre03 ...Explain the benefits of low-code development to an end user.	.000	.000
Posto4-Pre04...Identify data relationships needed for appropriate application development.	.022	

Postos - Preas ...Identify appropriate data types needed in an application.	.001	
Poseo6 - Preo6 ...Develop initial pages of an application.	.001	<i>Applied</i> .0 0 0
Posto7-Preo7 ...Develop a domain model for the application with appropriate relationships.	.000	
Posto8 - Preo8 ...Change appropriate data types in the domain model.	.001	
Posto9 - Preo9 ...Add values to an enumerated field.	.001	
Post10 - Pre10 ...Resolve errors in the application development.	.020	
Postn - Pren ...Identify data relationship issues (referential integrity).	.004	<i>Problem-Solving</i> .003
Post12 - Pre12 ...Identify data requiring modification to support application functionality.	.010	
Post13- Pre13 ...Evaluate User Interface consistency.	.001	
Post14 - Pre14 ...Assess the functionality (usability) of the application.	.011	
Post15 - Pre15 ...Conduct tasks related to meaningful evaluation of the application.	.007	

Table 2: Wilcoxon Signed-Rank Test Results for Low-Code Application Development Self-Efficacy Comparison Between Pre- and Post-test

Conclusion

Preliminary results demonstrated significant increases in computer-specific self-efficacy beliefs related to the use and understanding of model driven development and the technical requirements of the Mendix platform. Overall, the pilot implementation was sufficiently successful to support a larger implementation, refinement of the research model and more extensive data collection and analysis.

Understanding the student self-efficacy of no-code app development could prove to be valuable for faculty teaching introductory MIS courses in order to gauge whether intended learning of complex technology concepts is being realized. Our presentation will summarize the findings to date and discuss areas for further educational applications for no-code, low-code application development.

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United Nations Sustainable Development Goals and SAP Analytics Cloud

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Abstract

The United Nations created a plan for achieving a better future for all. This plan consists of 17 Sustainable Development Goals (SDG) to create a path to end severe poverty, combat inequality, and injustice, and defend our planet ("The SDGs Explained for Business," 2021). While most participating businesses recognize the importance of SDGs, progress is not occurring at the needed rate to meet the 2030 goal ("Making Global Goals Local Business," 2021). Organizations and business schools are working to incorporate the SDGs into their strategies and their business school's curriculum (Financial Times, 2021). Integrating the SDGs into business analytics courses could be an excellent method to develop the next generation of business leaders. This paper will outline how to use the SDGs in a business analytics course and present the perceived students' learnings.

Keywords: Business Analyst Skills, Sustainability Development Goals, SAP Analytics Cloud

Introduction

In September 2015, the United Nations created a plan for achieving a better future for all. This plan consists of 17 Sustainable Development Goals to build a path to end severe poverty, combat inequality and injustice, and defend our planet ("The SDGs Explained for Business," 2021). Accomplishing these goals will take an unprecedented amount of effort from governments and businesses. Businesses have been called upon to apply their creativity and innovation to help solve the SGD challenges ("Making Global Goals Local Business," 2021).

While most participating businesses recognize the importance of SDGs, progress is not occurring at the needed rate to meet the 2030 goal ("Making Global Goals Local Business," 2021). The pandemic of 2020 brought about a heightened awareness of injustice and inequities. Businesses are responding to the growing public scrutiny by embedding environment and social sustainability into their core business strategies, and business schools are responding in kind by incorporating more sustainability content into their curriculum (Financial Times, 2021). Integrating the SDGs into business analytics courses could be an excellent method to develop the next generation of business leaders. This paper will outline how to use the SDGs in a business analytics course and present the perceived students' learnings.

Business Analytics in the 21st Century

Today, data is constantly being generated. Every action taken, both online and offline, create data that businesses collect and use. There is an estimated 40 trillion gigabytes of data ("An Expanding Universe of Opportunity," 2021),

and every person will generate 1.7 megabytes of data every second (Bulao, 2021). This massive volume of data has made business analysts vital and in high demand. According to IBM, the annual demand for analysts will result in 700,000 new positions in 2020 (Newsroom, 2018).

The overall objective of a business analyst is to correctly identify problems and analyze big data from a variety of sources and communicate a holistic view of the data to make strategic decisions. A good business analyst can provide insights and predict trends that businesses can use to become more profitable, efficient, proactive, and intelligent. However, it can be challenging to find highly trained and capable business analysts.

Previous research has acknowledged problems that businesses face in finding new hires with good analytic skills (Mikalef et al., 2018). While some analytical skill shortcomings can be overcome with experience, higher education needs to focus on producing graduates with the skills required. In addition, business analysts need to understand how to work with and use the UN's SDG, especially in developing strategies. The following SAP Analytics Cloud project was created using the UN SDGs. This project was developed with the following learning objectives.

- 1) Develop the ability to research and develop a clear and concise analytic problem statement.
- 2) Develop the ability to find, clean, and import real data into an analytic system capable of analyzing.
- 3) Develop the ability to let the data lead the analysis and the ability to ask the needed follow-up questions and find additional data required for a thorough investigation.
- 4) Develop the ability to create clear and insightful visualizations that tell a compelling story.

SAP Analytics Cloud Project:

Data visualization is a method of visual communication that helps people comprehend the meaning and importance of the data being presented. By placing data in a visual context, we can solve issues such as: how might we better measure the progress of UN Sustainable Development Goals?

Along with UN Global Goal 13 - Climate Change - pick one of four key topics, Women, Sports, Fashion, or Gaming, to create data visualizations using SAP Analytics Cloud to find actionable and strategic insights.

Project Guidelines

- 1) You will need to clearly state and identify your chosen problem.
- 2) Define the methods used
- 3) Find the needed data
- 4) Clean the data
- 5) Load it into SAP Analytics Cloud and create your model
- 6) Create your visualizations and explain why each was created and how it should be used.
- 7) Develop at least four actionable insights from your finding.

Discussion and Conclusion

Overall, this project was well received. Students self-reported high levels of satisfaction and learning in their reflection comments. The following student comments provide support for continuing the project.

"This project helped me see what it's like working with real data."

"I feel my analytic skills advanced significantly. There is still so much to learn, but this project was a great introduction to the entire process."

"This project provided me with insightful data analytic skills that I had not tapped into before. Having a much better understanding of how to handle big data will help me in future endeavors."

"This project was an excellent tool in the development of managerial skills. We were required to identify problems, coordinate activities, schedule times, manage input in the story, and manage datasets."

"It was important in the project to narrow correctly down our topic and formulate well our problem statement in order to have a clear presentation. This project definitely helped me to identify a problem and research about it on different areas such as economical and political."

This project so far has only been incorporated at the MBA level at one medium-sized public institution. For future research, the project will be used modified to use at the undergraduate level at two other public institutions.

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To Play or Not to Play: A Case of an ERP Simulation in the Online Mode

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Abstract

In this article, we describe ERP simulation (ERPsim) in an online format. ERPsim is usually conducted in a face-to-face activity at a regional Midwestern university. However, the Coronavirus pandemic precluded the possibility of a face-to-face event. Therefore, we adapted and successfully delivered ERPsim in an online synchronous format. This article details the context, choices, and lessons learned from the experience.

Keywords: ERPsim, online, simulation.

Introduction

"Tell me and I forget, teach me and I may remember, involve me and I learn."

Xun Kuang, a Chinese Confucian philosopher

As researchers and educators, we understand the value of being involved in the subject we are attempting to research or teach. The value of problem-based learning that encourages experiential learning is long established in the pedagogical literature (Furman and Sibthorpe, 2013). These principles have also been used in business schools to teach fundamental business processes of order-to-cash, procure-to-pay, and make-to-stock. They are embodied in an ERP simulation named. ERPsim (Leger, Charland, Feldstein, Robert, Babin, and Lyle 2011). ERPsim was developed to gamify the learning and deliver experiential learning to students (Angolia and Pagliari 2018). It has been widely adopted across the globe. The authors use this simulation for a college-wide competition at a regional Midwestern university. The competition is held every year where industry mentors coach student teams. The student participants can network and win scholarships. This event was also planned for the year 2021 in February. However, due to the coronavirus pandemic, we were precluded from the face-to-face format of the competition. We were faced with the challenge of replicating the simulation competition online. While it is understood that the online event cannot wholly replicate the face-to-face competition environment, we could retain the essential elements of the competition. These centered around team communication, camaraderie, learning, and networking. This article explains how we achieved so, the tools used, lessons garnered, and potential improvement that can be done in the next iteration.

Majors Challenges and Resolution

In this section, we describe the roadblocks that we encountered and their resolution.

Recruiting Students

The competition recruitment drive and subsequent practice rounds usually run from October end to January before the Spring semester of the competition year. However, in 2021, that option was ruled out due to the pandemic. Instead, we turned our attention to online recruitment. We faced many hurdles, as it was difficult to disseminate the information to our students and secure their commitment to online practice rounds. We updated our approach by involving various stakeholders such as faculty, advising office, and alumni. We pitched the value proposition of participating in ERPsim via inst ructors. We also involved some of the alumni as they articulated the value of the event to our students. As a result, we were able to motivate 100 students, forming 24 teams that competed against each other in practice rounds. Each team was also paired with an industry mentor. A total of 22 firms participated in the practices and the final event.

Selecting an Online Platform

As we navigated the uncertain environment, the next problem we faced was the choice of tools that would allow a large-scale online synchronous event. We had three obvious choices in terms of the platform: Zoom, MS Teams, and WebEx. All of these tools provide synchronicity, recording, and screen-sharing (Lieux, Sabottke, Schachner, Pirtle, Danrad, & Spieler. 2021). However, MS -Teams was the least effective online conferencing tool (Pal, Vanija, and Patra, 2020). Two attributes beyond those already known in the extant research came to the fore as detailed in the following table:

Table I. Platform Comparison

Platform \ Attribute	Breakout rooms	Screen-sharing and viewing participants at the same time
WebEx	Yes	Yes
Zoom ¹	No	Yes
MS Teams	No	No

Table 1. Platform Attributes

Only WebEx provided (at the time) pre-assigned breakout rooms based on ordered CSV files. Thus, it became the deciding factor for tool adoption. Having decided on the appropriate tool and recruited the students, we began our simulation practice. The practice was held twice a week up until the competition in February 2021. In addition to allowing each team to acquaint themselves with their teammates, these practices were open to industry mentors. As a result, many of them joined the practice, further motivating the students.

None of the tools mentioned above provides the user with the ability to traverse across the breakout rooms. In face-to-face settings, our industry mentors can walk around the competition arena and observe teams other than their own. Such an atmosphere provides a flood of networking and recruiting opportunities for mentors and students. In addition, mentors can interact with students from teams other than their own. However, our industry mentors could not deviate from the pre-assigned breakout rooms in the online format unless we made them "co-host" of the simulation event. However, making a person "co-host" of the online event comes with risk. The "co-host" can inadvertently shut down the event. We wanted to prevent an abrupt shutdown of the event. Thus we could not make our industry mentors "co-hosts." Such a situation

¹ Please note that Zoom has a breakout feature now, it was not available in February, 2021 (when ERPsim was scheduled at our university).

underscores the need for designing a role that allows the participants to move across the pre-assigned breakout rooms without giving them the "co-host" privileges.

Competition Day

After rigorous practice, the event was successfully conducted with 92 students, 63 mentors from 22 firms, and 58 guests, and 8 faculty and administrators. It was the first time we had conducted such a large-scale event entirely online.

Conclusion

The critical lesson of the exercise was that almost all aspects of the ERP simulation can be replicated online with proper planning, communication, and tools. Access to tools is necessary but not sufficient condition for the successful synchronous online competition like ERPsim. First, communication and coordination between the organizers as well as the stakeholders are paramount. Next, such an event cannot be executed without repeated practice. Thus, motivating students to attend practice rounds is crucial. Finally, all teams must be comfortable using the tool of choice. They must have the ability to communicate with their teammates and industry mentors and have a developed game-play strategy by the game day. An effective tool like WebEx dramatically improves the odds of a successful event. However, it can still use improvement, such as providing the user to traverse from one breakout room to another. Such a feature is missing in WebEx and Zoom. These firms and the users of these platforms would greatly benefit from a feature that allows the user (in a particular role - say mentor/visitor) to traverse across breakout rooms.

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Incorporating Ethics in IT/MIS Classes: A Role Play Approach

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Abstract

Despite the need for significant ethical reasoning in IT/MIS decision-making, many business schools still do not include ethics-related material in their IT/MIS courses (Peslak, 2006; Joseph, 2007; Harris & Harris, 2009; Stahl, 2011; Harris, 2011). One reason business schools have been slow to integrate ethical reasoning into their IT/MIS curricula may be a lack of understanding of pedagogical methods that allow students to explore their moral intuitions and thereby open critical discussions on what can sometimes be a complex topic (Bynum & Simon, 2004).

This paper presents an experience report of a role-playing exercise that instructors can use to integrate ethical reasoning into IT/MIS courses. Role-plays have been used to facilitate a deeper and more critical understanding of course material across multiple disciplines (Shapiro & Leopold, 2012). Role-play exercises can improve critical thinking skills (Rashid, 2017) and improve students' abilities to apply ethical reasoning to resolve ethical issues (Vartiainen & Siponen, 2010). Engaging IT/MIS students in a role-play allows them to compare and contrast traditional ethical theories, popular and contemporary attitudes, and their personal moral intuitions to arrive at reasoned decisions in the face of complex ethical situations (Stahl, 2001). Therefore, role-play exercises represent a promising pedagogical method for enhancing student learning on moral reasoning in IT/MIS decision-making.

Keywords: Role-play, Information ethics, Business information systems, Management information systems, ERP system ethics, ERP ethics case study

Introduction

Advances in information technology/management information systems (IT/MIS) represent a crucial source of business innovation, allowing companies to drive efficiencies while also responding to fast-changing customer markets (Brynjolfsson & Hitt, 2000). Indeed, research suggests that businesses may be in the early stages of a digital transformation that will reshape economic activity over the coming years (Popkova, Ragulina & Bogoviz, 2019). Therefore, companies and technology service providers are under tremendous pressure to incorporate new technological solutions into organizations or risk being left behind (Koch & Windsperger, 2017).

However, the race to develop IT-driven business models also creates a vast array of new situations that require ethical reasoning (Brusoni & Vaccaro, 2017). From the application of artificial intelligence to social media to collecting personal data in the aftermath of the COVID-19 crisis, companies are having to navigate an ever-changing ethical landscape (Pazzanese, 2020).

Course Setting

The role-play can be used in a variety of course settings. The role-play is best used to supplement in-class discussions on ethical reasoning and apply various moral arguments to actual business situations. In particular, it is highly recommended that the instructor introduces core ideas related to consequentialist and categorical (deontological) frameworks for ethical reasoning (Derry & Green, 1989). Consequentialist and categorical reasoning are two primary types of moral reasoning that students will hear in business and broader social settings (Kvalnes, 2015). It is therefore critical to familiarize students with each approach. Characters in the role play will espouse each type of reasoning, and part of the learning in the role-play will be to identify which type of reasoning each character is advancing and why.

Role-Play Scenario

This section presents an overview of the role play, entitled "The Night Visitor." A detailed presentation of the scenario can be sent upon request.

The role-play presents a scenario in which C/D/H Consulting, a technology services provider, has been hired to help a client upgrade SAP their enterprise resource planning (ERP) system. Because the ERP system runs the client's entire factory, which employs 725 people per day, the client needs to shut down operations to complete the upgrade. Any problems with the upgrade would delay production and therefore be very costly to everyone involved. On the weekend of the planned shutdown and upgrade, the upgrade experiences unexpected problems.

The role-play involves four characters: (1) Greg, C/D/H Consulting's lead consultant on the project; (2) Paul, C/D/H Consulting's managing partner, and Greg's boss; (3) Sandy, the client's director of information technology; (4) Jeff, the client's chief financial officer. In response to the problems that occur with the upgrade, Greg makes a series of decisions to ensure the upgrade is completed on schedule. The action of the role-play occurs as each of the four characters react to Greg's decisions, assessing them using consequentialist and categorical ethical reasoning.

Role-Play Setup

The instructor divides the class into groups of four, with one student in each group assigned one of the characters. Because each character has a substantial "backstory" that provides context to their character's role in the scenario and specific information that only their character knows, it is strongly recommended that these assignments be made three to four days before the role-play is enacted in class. Thus, the instructor needs to prepare in advance to distribute the scenario and character-specific "backstories" to students.

Students should be directed to prepare in advance by thinking about their values and deciding how to approach the role-play scenario from their character's perspective. This preparation work should be completed individually. Students should be directed not to discuss their character or approach with others in the class before the role play.

Students must become familiar with the unique information related to their character's "backstory." A large segment of the role play revolves around the information students decide to share with other characters and which they choose to keep to themselves. Thus, each student must determine which of the items known to their character are pertinent to addressing the situation and which are not. It is strongly recommended that students print out the scenario and their character's backstory and bring it to class. Students often need to reference these documents during the role play.

Enacting The Role-Play

On the day of the role-play, the instructor should arrange the classroom in "conference rooms," consisting of a table, four chairs, a marker, and name tents. As students sit down to start the role play, they assume all four characters have just arrived at their "conference room" at 8:00 a.m. on Monday, the first workday after the weekend upgrade. They are meeting to discuss the upgrade and all that transpired over the weekend.

For the role-play to be most effective, each student must stay in character from the start of the activity until the instructor signals that it is time to debrief. The instructor should encourage students to use first-person language when referring to their characters and character names when referring to others. Name tags that identify each student as their character are helpful in this regard.

Paul, the consulting firm's managing partner, typically begins the conversation, but any of the characters can start. The instructor should encourage students to begin sharing their perspectives on the weekend's events.

The instructor should let the conversations flow for several minutes until students have become comfortable as their characters and preliminary information has been disclosed among the group members. The instructor should then temporarily pause the role play and inform groups that the role play is over when a group can answer the questions listed in Table 1. These questions should not be distributed to students in advance but should be shown to students only on the day of the role play. An effective means of showing the questions is to project them onto a screen at the front of the classroom.

Question 1:	What was the final price of the "Upgrade Project" that was billed and collected by C/D/H? How was this amount decided upon?
Question 2:	If you are Jeff: what has Jeff decided to do about Sandy and his company's IT department? If you are Sandy: What has Sandy decided to do about C/D/H, Greg, and her own staff? If you are Paul: What did Paul decide to do about Greg, the client, and the project? If you are Greg: How did Greg feel about the project after talking to Sandy, Jeff, and Paul?

Table 1: Questions that Each Group/Character Must Answer

As individual group conversations begin to conclude, the instructor should ensure that each group can answer the questions listed in Table 1. Groups will reach this milestone at different times; some groups may need a time limit placed upon their conversations to force a conclusion. In total, enacting the role play should last 30 minutes. As the role-play concludes, the instructor can move on to reflective exercises.

Discussion

The role-play discussed here allows students to apply different types of ethical reasoning in a low-risk and (hopefully) fun environment. To maximize the likelihood of success, instructors should take care to prepare their students for the exercise. Instructors should emphasize that the role-play is about student participation and learning - and not student acting skills. The role-play is not a performance. It is an opportunity to exercise moral imagination by taking on the perspective of another person. Students should therefore be encouraged to think about how their character might behave given a set of circumstances and then use that imaginative experience to inform reflection on how they might behave under similar circumstances (Brown, 1994).

Instructors must also be open to a range of student responses to the role-play. Students will take different insights from the role-play. Some will appreciate dealing with "real-world problems" and enjoy acting as leaders within an organization. Some will focus on the struggle of the primary ethical dilemma. Some others will concentrate on the critical issues of assessing trust and honesty from their other role-play colleagues. Still, others will enjoy the ability to step away from themselves and act "hard-headed" or "meek-and-mild," when their more common behavior may be the opposite. Table 2 provides examples of some of the feedback instructors might receive from students.

Prompt	Student Feedback
The role-play approach enhanced my learning and understanding of ethics...	<p>"I think the thing about the role plays that makes them so successful is the fact that they are real situations. It is one thing to be put in a hypothetical scenario...these situations that have actually happened make me actually think about what I would actually do in the real world."</p> <p>"These have helped me the most in taking the material out of the PowerPoint and applying it to real situations."</p> <p>"The requirement to put ourselves directly in the ethical dilemma that is presented to us will, in my mind, benefit us much more than some spreadsheet or formula we had to memorize."</p>

Table 2: Anecdotal Student Feedback

Conclusion

Students entering roles in IT/MIS will be required to operate in an increasingly complex ethical environment. Despite the need for significant ethical reasoning in IT/MIS decision-making, many business schools still do not include ethics-related material in their IT/MIS courses (Peslak, 2006; Joseph, 2007; Harris & Harris, 2009; Stahl, 2011; Harris, 2011). Role-play exercises represent a promising pedagogical method for facilitating a deeper and more critical understanding of ethical decision-making related to IT/MIS. This paper presents an experience report of a role-play exercise conducted in a large, four-year public university in the United States. The exercise allowed students to practice "moral imagination" by asking students to take on roles that might express points of view different from their own. Finally, the role-play exercise provided students with an opportunity to present sometimes conflicting views through reasoned and respectful debate. It is hoped that the material and suggestions provided in this report will aid other faculty with teaching this sometimes difficult topic.

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Teaching Segregation of Duties using S/4HANA

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Abstract

The presentation describes curriculum materials for teaching segregation of duties (SOD) using the SAP S/4HANA system. Student responses from accounting and non-accounting students support the utility of the materials for enhancing student understanding of business processes, the significance of SOD in mitigating fraud and other risks, and the implementation of SOD in an enterprise system.

Keywords: Segregation/separation of duties, principle of least privilege, enterprise systems, SAP

Introduction

Segregation of duties (SOD) is considered one of the most important internal controls for organizations (Kim et al., 2020). In practice, the SOD control should contribute to systems analysis and design (Buyens et al., 2013), in general, and the design and implementation of ERP systems (Lightle and Vallario 2003), in particular. In courses covering accounting information systems (AIS), students learn SOD through lectures about concepts and transaction simulation role-playing games (Walters 2011). Information systems majors may encounter least privilege concepts as part of broader coverage of security considerations in analysis and design. The presentation summarizes the use of curriculum modules that provide SOD-related hands-on activities in an enterprise system (SAP S/4HANA) in undergraduate AIS and systems analysis and design classes at two schools.

Curriculum Overview

The authors developed the curriculum activities to address student learning goals related to students' ability to understand key business processes, develop a risk perspective related to processes, appreciate the importance of SOD for risk mitigation, and understand how SOD can be implemented in an enterprise system. The procure-to-pay (P2P) process provides the context for the SOD activities since procurement fraud is a common and costly fraud category (Moser & Olsen, 2012). The curriculum activities are progressive and organized into the following steps.

Step 1: P2P without SOD

The instructor oversees the first level of a role-playing game focused on a conceptual understanding of the transaction and document flows in a P2P process. Afterward, students execute typical P2P process tasks in an SAPS/4HANA system with user IDs that have a broad array of system authorizations.

Step 2: P2P Fraud Risk without SOD

Students participate in a second level of the role-playing game in which the instructor leads a discussion of risks associated with decision points in the P2P cycle and how SOD can guard against fraud. The instructor may also introduce the CARE framework (Kim et al. 2020, Table 1) to help students understand segregation of duties. The curriculum contains four common procurement fraud scenarios that the instructor can use to provide specific examples for students. Students are then asked to plan and simulate one or more of these fraud scenarios in S/ 4HANA with their user IDs from Step 1. Given the broad privileges these IDs have, students will have no problem demonstrating how the fraud could be perpetuated in an enterprise system.

Step 3: P2P and Fraud Risk with SOD

The authors developed five new roles in S/ 4HANA (inventory clerk, purchasing clerk, warehouse clerk, accounting clerk, controller) with each role being assigned only the system privileges needed to perform the employees' respective duties. Students can be divided into teams of five (ideally) with each student assigned a user ID associated with one of the five SOD-based roles. The student teams first perform the typical P2P process tasks to understand how the new SOD user IDs work. Then they attempt to simulate the same fraud in S/ 4HANA as in Step 2 and find that either collusion is required or the fraudulent activities are not permitted at all due to the strict permissions of the SOD-based user IDs.

Step 4: SOD Authorizations and Roles

In order to understand how authorizations are implemented in an enterprise system, students review and discuss the S/4HANA authorizations associated with the inventory clerk role.

Results

Two faculty members from different institutions incorporated the SOD curriculum into two undergraduate classes (integrated accounting systems and systems analysis and design) and conducted a student survey regarding the value of the activities vis-a-vis the curriculum learning goals. The results support a finding that the curriculum enhanced students' perceived understanding of the SOD-related concepts.

Discussion

Our hands-on exercises for SOD improve accounting and non-accounting students' understanding of internal controls and fill the literature's gap on teaching how to audit the implementation and operation of internal controls. The curriculum module can easily be incorporated into classes that cover accounting information systems, systems analysis and design, auditing, and enterprise systems configuration.

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Using ERPsim to Conduct Experimental Research Remotely

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Extended Abstract

Remote behavioral experiments can increase the external and ecological validity of research projects. This presentation proposes a methodological framework using the academic business simulation ERPsim, based on SAP S/4HANA, as the controlled virtual problem-solving environment in a behavioral decision-making experiment.

Keywords: ERPsim, SAP, behavioral research, remote experiment, decision-making

The recent global pandemic and resulting distancing measures made finding enough participants in a laboratory-based experiment more difficult. In these circumstances, a promising alternative is to conduct remote experiments using ecologically valid stimuli. Aside from their benefits in circumventing the logistics hurdles in the pandemic, remote, in-situation experiments can also lead to alternative explanations that may not be possible to gather using laboratory experiments (see (Rogers et al. 2007, p. 337) for examples). ERPsim has already been used as an experimental platform in a wide range of scientific publications to conduct face-to-face experiments (e.g., (Cronan et al. 2012)). In a recent conference proceeding, we report results from a remote experiment using ERPsim (Oz et al. 2020). In that paper, we investigated how digital nudges impact decision-maker performance. Building on our experience with that study, we list several recommendations on using ERPsim to design an effective remote experiment.

Our methodological framework consists of three tools: (1) an online conferencing application to conduct sessions, (2) a data analytics tool that can connect to an OData source and publish designed artifacts, e.g., dashboards, on the web, and (3) an ERPsim client (Leger et al. 2007; Leger 2006). Moreover, an online survey tool can be used for psychometric measures, and a webcam can be used for facial emotion analysis. First, we suggest selecting one of the decisions in ERPsim as the base experimental task, such as stock transfer planning, pricing management , and marketing expense planning. To make the experiment simple enough, the remaining tasks can be automated to be made by the ERPsim simulator. As the experimental stimuli, a dashboard is recommended. A data analytics tool that can connect to OData and publish its results as a web page will allow researchers to design different dashboards as information technology (IT) artifacts for each experimental condition.

Although there are limitations in controlling participants ' environments, this framework can contribute to research by enabling cost-effective data collection with acceptable external and ecological validity.

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ERP Configuration and Data Analytics

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Extended Abstract

Keywords: ERP, Configuration, Relational Database, In-Memory Database, Data Analytics.

The Fitter Snacker configuration exercises have been rewritten for the SAP S/ 4 HANA system. These exercises have also been streamlined so that an additional module can be included in a semester's course. This extra module covers the basics of database management systems, the differences to a traditional relational database that in-memory brings, and exercises to explore the data in an SAP system.

The Fitter Snacker configuration exercises have been used for 17 years successfully in many university classes. These exercises walk students through configuring Fitter Snacker and then ask the student to adjust the exercises for an additional company, Marshall Muffler. The exercise book reaches almost 500 pages, with 13 modules and 5 transaction tests, ensuring the student has a good understanding of the extent and complexities of configuration. The exercises have step by step screenshots to ensure minimal errors.

In the fall of 2020, new configuration exercises were classroom-tested to use the SAP S/ 4 HANA system. Any roadblocks were discovered and corrected. The changes to the exercises included the new business partner concept, pre-configured production planning, the material ledger, and much more. The material ledger was a huge sticking point which students missed activating before creating materials, which then caused errors. Students then had to circle back and create new materials to correct the problem. In the final version of the exercises, these problems were corrected, and large warning screens included to ensure students have the material ledger activated before creating materials.

In rewriting the exercises, some of the previous work has been streamlined so that students can complete both the Fitter Snacker configuration and the Marshall Muffler configuration in less time. This leaves room in the semester for an additional segment on databases and data analysis. In this portion of the class, the instructor will refresh the students' memories on relational databases and show how an in-memory database functions. Then exercises will step the student in extracting data from the system and then analyzing that data in either Excel, Tableau or any other visualization system.

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GBI Bike Model for Operations and Supply Chain Management

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Extended Abstract

To gain a better understanding of Bill of Materials and Routings, these wooden bike models were created to simulate a training environment to assemble GBI DXTR bikes. This demonstration will show how to assemble 1-10 bicycles based on the BOM and routing information found in the GBI data set. Hands on learning reinforces the topic, and this assembly line simulation will help the students grasp the basics of Production and Operations Management.

Keywords: Operations Management, BOM, Routings, assembly, hands on learning.

Introduction

This TRED talk is focused on faculty teaching Operations and Supply Chain Management.

The GBI DXTR1000 is the primary model in the SAP UA GBI data set. For students to better understand the concepts of Bill of Materials (BOM) and the relationship with Routings, wooden models of the DXTR were created. Using the story line of a training session for GBI fabricators, these models contain all the materials in the DXTR BOM. Students will use the existing DXTR routing to assemble the model bikes. Additional materials (nuts, bolts and washers) are used in the assembly. This gives the instructor the option of having the students create a new BOM for the practice assembly bike.

Models

The models were created to simulate the assembly process of the DXTR bicycles. Simple in design, each part has the 4-digit Alpha designation of the part numbering used in GBI. The models are scaled down to $\frac{1}{4}$ size. To simulate the need to know how to differentiate between parts, some of the parts are a similar shape and size yet have different part numbers and are not interchangeable. A set includes all the parts needed to build ten model bikes. This allows for assembly line simulation and designated workstations to be replicated.

Conclusion

Hands on experience has been shown to reinforce learning. The GBI Wooden Bike models will help students better understand Bills of Materials, Routings, and how the two work together.

Making Information Tangible using Fischertechnik Learning Factory 4.0

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Abstract

Teaching how businesses processes integrate with one another has always been a rather theoretical and intangible activity. We use ERP systems (SAP) to help put the theory into more concrete terms, still students oftentimes struggle to grasp the concepts, especially when limited to 16 weeks of learning. The presentation describes how CMU is implementing the use of the Fischertechnik Learning Factory 4.0 to help provide a real-time, hands-on experience in the classroom.

Keywords: SAP ERP, ERPsim, Process Integration, IoT

Introduction

In order to teach students about business processes integration, business schools utilize Enterprise Resource Planning (ERP) applications such as SAP as an aid to instruction. Students apply business skills learned throughout the business curriculum (finance, management, supply chain, etc.) to support business decision making, and to see how each decision in one area impacts things in other areas. Additionally, the SAP ERPsim is used to offer students the opportunity to apply their newly learned skills.

The Learning Factory

Even with the use of SAP and the ERPsim in the class room, students still struggle with connecting changes made in the system with the related physical activities. To help address those issues, one business school has obtained the Fischertechnik Learning Factory 4.0 (Image 1) and is working to develop scenarios where students will complete procure-to-pay, plan-to-produce, and order-to-cash (e.g. goods receipt from a vendor, goods issue to a production order, etc) tasks in SAP. Those tasks will lead to physical movements of goods within the factory. Those physical movements can be seen in the factory, while at the same time the integrated information systems will display the changes in the various inventories quantity and value.

Other topics include discussion of IoT topics. The factory includes various environment sensors (temperature, humidity, etc) as well as a camera to show real-time movements in the factory. These tools are available remotely, which will help demonstrate to students the ability to monitor the factory from home and perform remote troubleshooting.

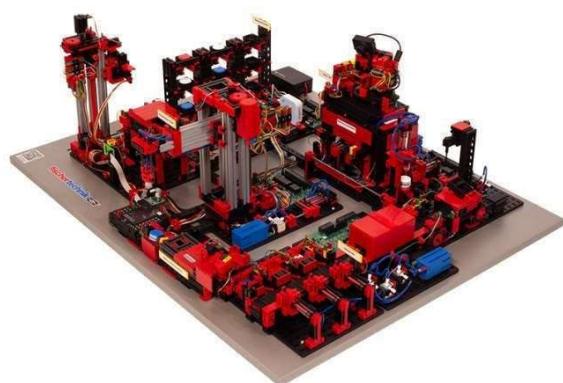


Image 1

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Image 1:

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Tying it All Together - How Case Studies Make Sense of ERPSim and ERPSim Makes Sense of Managerial Accounting

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Extended Abstract

Keywords: ERPSim, managerial accounting, Excel, analysis

The Managerial Accounting Fundamentals (ACCTG202) course is a prerequisite for students who wish to pursue a degree at the Fowler College of Business (FCB), San Diego State University. A large proportion of pre-business students consider it a "necessary evil" and have typically been uninterested in the course and disengaged from its content. Offered as a traditional "lecture - homework - exam" modality, students frequently did not acquire or retain an understanding of the twelve (12) key learning outcomes. In addition, the course delivered in the traditional modality, has contributed to a misconception that accounting is boring and irrelevant. In early 2020, Janie Chang and Nancy Jones, of the Charles W. Lamden School of Accountancy in the FCB, acquired funding to redesign the course to mitigate these issues and to introduce analytical and Excel skill building that had not been in prior ACCTG202 content. After almost a year of development, the newly designed course was piloted, revised for virtual delivery, and finally rolled out to all 974+ pre-business students in Spring 2021.

One of the key components of the redesigned course is the addition of the advanced manufacturing game from ERPSimiⁱ during the last five weeks of the semester. The students study managerial accounting theory for the first eleven (11) weeks of the course in a flipped classroom modality. During that time, they solve problems and complete case studies during class and take chapter exams as they might in a traditional class. A team presentation of the ERPSim activities and how managerial accounting concepts helped the team play the game takes the place of the final exam. Presentations are evaluated by industry professionals and faculty.

While we believe that the use of ERPSim in the introductory managerial accounting course is not novel, what is unique about this course, is the use of ERPSim-related case studies completed by the students each week. The case studies illustrate managerial accounting concepts and introduce the students to the facts of the ERPSim business scenario at the same time. For example, one case study talks about the standard cost of making a box of nut muesli. Students then do some "what-if" analysis to illustrate how changes in raw material and labor quantities and prices can lead to standard cost variances. Each case study is done in Excel and correct answers result in various charts and graphs to further emphasize the concepts. Results of the technical completion of the cases lead to thought-provoking questions that can be answered in the context of a muesli manufacturer.

The case studies check off many boxes: 1) students are introduced to the muesli manufacturing game before they play the game, thus reducing the game learning curve. 2) managerial accounting concepts are illustrated and explained using a single case throughout the semester. 3) students learn Excel and analysis skills during the completion of the case studies. 4) students apply their knowledge and expand on that knowledge in a "real life" business scenario.

i <https://erpsim.hec.ca/en/erpsim>

Next Generation Material Requirements Planning (MRP) with Fiori Apps, Integration with accounting

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Extended Abstract

Keywords: Curriculum innovation, Next generation MRP with Fiori Apps, Integration with accounting.

Introduction

Karpak, Wright and Henderson, continue integrating SAP into Financial, Managerial Accounting as well as Operations Management classes. Wright is now instructor for Honors students in Financial Accounting. She does Financial Accounting with SAP S/ 4 HANA using Global Bike. Whereas SAP with S4 HANA is introduced Managerial Accounting students again with Global Bike by Henderson and Karpak. In this TRED talk authors will concentrate how Material requirement Planning (MRP) are handled with FIORI Apps, and how it is integrated with accounting. Students learn MRP concepts by actually experimenting on an ERP system.

Authors find that students are so used to using Apps in different situations they find SAP with Fiori Apps very intuitive, very easy to learn. Accessing SAP via Fiori Apps have been computer agnostic, it does not make any difference whether students have PC or MAC. This was even more important in cyber learning environment.

Learning Outcomes

1. Understand some basic features of ERP systems
2. Differentiate independent demand management from dependent demand management
3. Understand Bill of Materials, lead time, gross requirements, projected on hand, planned order release, planned order receipt and scheduled receipt concepts.
4. Be able to develop material requirements planning for dependent materials considering stocks, lead time and lot sizing rules.
5. Understand how MRP is integrated with accounting.

Concepts Learned

First, we explored Global Bike Inc. (GBI) data base. While exploring Finished goods, bicycles, students learned MRP concepts such as MRP type, different lot sizing rules, lead time. Understanding Bill of Materials (BOM) concept was easy for these students since they have already learned this concept in their managerial accounting class. They had already learned that BOM is not just used in operations management but in cost accounting, in sales and distribution, and in enterprise asset management as well.

We developed Planned Independent requirements (PIRs) for our master production items. We run MRP and explained how different materials are planned for different time periods considering stocks, lead time and lot sizing rules.

Next step was purchasing the materials to produce finished product. That is where interaction with accounting started. System asked the price; we discussed from where the price will come in real life what we need to do to give a reasonable price in this simulated environment. When purchasing transaction processed we explored the impact on GBI. Entire procurement cycle completed until we paid the vendor and at each step students experienced the impact on accounting, on material master data as well as on inventory of this material in quantity and in value.

Conclusion

Lecture notes "Next Generation ERP, Material Requirements Planning with Fiori Apps and integration with accounting," have developed and will be shared with the interested audience. We benefited as a team from our different backgrounds, industry experiences and we think we have enjoyable learning environment and generating business ready students. Our students find jobs/internships in fortune 500, 1000 companies, and some in small medium enterprises based on where their dream job is. We don't have enough students for the companies who seek our graduates. We have more demand than our supply. Our next step is to increase this student pool.

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Fostering Social Responsibility in ERP course leveraging the UN Development Goals

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Extended Abstract

In 2015 world leaders agreed to 17 goals for a better world by 2030. These goals have the power to end poverty, fight inequality and stop climate change.

This presentation will discuss how the UN Development Goals are used to foster social responsibility within an ERP/Computing Applications undergraduate course. The course uses an assignment where teams of students are assigned 3 UN Development Goals to research and discuss what the goal aims to achieve in terms of outcomes and metrics and to identify how ERP related technologies like SAP, Analytics, Internet of Things, Mobile Computing, etc are used to support achievement of the goals .

Will provide assignment details and some sample answers from students submissions.

Keywords: Social responsibility, UN Development Goals, SAP, Analytics, Mobile Computing, Internet of Things

Academic-Industry Partnerships for Positive Change

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Extended Abstract

The world, and the research landscape with it, have changed drastically as a result of the global pandemic. While it is obvious that research collaborations are still instrumental in our field, this presentation explores how these collaborations can fuel positive social change and empower academics and practitioners moving forward in this new world.

Keywords: Partnerships, Research, Diversity.

Partnerships for Positive Change

The global pandemic has brought people all over the world to an online workplace out of necessity. For most of us, this means a scramble to figure out remote workflows, but it also presents an incentive for more global collaboration-with teams all over the world driven online. Amidst these sweeping changes to how we communicate, the pandemic has had the effect of making social and economic inequality even more obvious. But after the pandemic, we are going to have to deal with what comes next. The future of an economy unavoidably pulverized by lockdown; unparalleled financial inequality; a fractured education system; and those challenges we were already facing pre-2020 are still looming over us. To counter these societal challenges, we will need to innovate, develop new markets, and new technologies, re-think our education system, and more. Fittingly, we are seeing a long-overdue urgency to act on related issues in our industry, such as addressing systemic issues in the workforce, representation in the products we create, and the attention given to accessibility concerns.

These are significant challenges requiring significant effort to address, beyond what any one organization could hope to achieve. Thus, this presentation will focus on how we can work together through collaboration across institutional borders to create a more connected, inclusive, and productive community as we enter the next decade. At the heart of this presentation is the consideration that we can work together across institutional borders to create a more connected, inclusive, and productive community in our sector.

In some ways, academics and industry professionals may be seen as two extremes, but we're working towards the same eventual goals: making products better, and making better products, along the way positively impacting society. The obvious answer here, and the one this presentation will be advocating for, is to embrace collaboration in the broadest possible sense as a driver for positive impact. And to take a critical look about how we treat collaboration in general. For academics, this may mean compromising on some of the things we're usually forced to focus on, like citations and publications per year. For the industry, it may mean engaging more actively with R&D programs, embracing technological leaps, and paying greater consideration to social issues. Collectively, we need to make it easier for academia and industry to develop impactful solutions and share knowledge. This could be joint investment in R&D work between universities and the industry. It might involve data clearinghouses, which take industry data and anonymize it for use in academic research. It could mean co-development training programs and courses. This presentation calls to use the research capacity and diverse backgrounds of universities and companies to push the entire field forward.

The aim isn't to prescribe a specific course of action, but to talk about current challenges and what we might do to address them. Specifically, to talk about **Education**, **Socialisation**, and **Accessibility**, as well as **Equality**, **Diversity**, and **Inclusivity**. These are not the only challenges we face, but they form a jumping-off point.

The Impact of Self-Efficacy from Virtual Job Shadows on High School Student's Major Selection

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Extended Abstract

Previous research has highlighted the need for information systems graduates from post-secondary schools (Muraski et al., 2021). One of the key challenges involves how to facilitate post-secondary (college) information systems major selection by secondary school graduates. To counter continued apathy and lack of interest in information systems majors (Burns et al. 2014), a growing number of secondary schools and non-profit organizations have introduced new, exciting technology courses (cyber security, IOT, etc.) while others have started offering job shadows, including virtual job shadows.

Job shadows include allowing students to step into different work settings and experience what that workplace has to offer and learn about different roles. Inspire Sheboygan County has been offering job shadows for the past 6 years. In 2020, the pandemic facilitated a pivot to a complete virtual experience with over 33 different career areas, including information technology. The shift to a virtual job shadow also allowed over 4,000 students to experience different careers throughout the 2020-2021 academic year. Initial data was captured for all virtual job shadows, regardless of career focus. Question 1 asked if the career mentor was knowledgeable in the subject area (99% indicated yes). Question 2 asked if the participant found the session useful in making decisions about their future career plan (95% initiated yes).

Self-efficacy, an individual's belief they can perform a task, has been an accepted predictor of career choice (Conklin et al., 2013; Pulliam et al., 2017). There has been no identified research on self-efficacy relating to job shadows and career selection within a secondary school context.

The purpose of this proposed research is to examine the effect of IS virtual job shadow programs on secondary school students' career related self-efficacy and their major and career choice. Specifically, the research aims to address the following questions: 1) *Does participation in an IS job shadow increase a student's belief that they can perform well in an IS career?* 2) *Does participation in an IS job shadow increase a student's intention to pursue an IS major?* and 3) *Does participation in an IS job shadow increase a student's intention in pursuing an IS career?*

A mixed methods survey will be developed and administered to cover self-efficacy for choosing an information systems-related major and career, behavioral intention to choose an information Systems-related major and career. Similarly, several qualitative questions focused on what prevents students from selecting a major or career, what motivates students in selecting a major or career, and what are major considerations in selecting a major or career.

Keywords: Virtual Job Shadow, IS Enrollment, Self-Efficacy, Behavior Intention

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How could mind wandering impact home office users of business information systems?

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Extended Abstract

Keywords: Mind wandering, home office, remote work office productivity, cognition

Workplaces in around the world embarking on a radical digital transformation that could fundamentally alter how offices work. Originally motivated by the widespread adoption of remote offices during COVID-19 (Gallacher & Hossain, 2020; PWC, 2020), remote office models seem to be here to stay, as employees increasingly demand greater work-from home options (Reyt, 2020). In order to facilitate this shift, workplaces must facilitate efficient practices.

There are many factors that are believed to impact home office productivity, though one of the least understood is that of mind wandering. The term "mind wandering" can mean many things, though has been described by scholars as an experience whereby our attention becomes detached from our immediate environment and becomes redirected towards our internal thoughts and feelings (Fox & Christoff, 2018; Smallwood & Schooler, 2015). While external distractions are abound in a home environment, even highly productive home office workers who control these may still be subject to internal processes such as mind wandering. After all, it is common to experience mind wandering during university lectures (Conrad and Newman, 2021; Wammes & Smilek, 2017), or even when taking a shower (Baldwin et al., 2017). This phenomenon often occurs in the resting state and can be pleasurable (Buckner & Vincent, 2007; Smith et al., 2009) though is often recognized to be undesirable in some circumstances (Smallwood et al, 2007; Smallwood & Schooler, 2015)

In the context of information technology, mind wandering has been acknowledged as a complex phenomenon which could impact information technology use in a variety of ways (Conrad & Newman, 2019; Klesel et al., 2021; Wati et al, 2014). For example, Sullivan et al., (2015) showed that mind wandering correlated with creativity during IT use, while Conrad & Newman (2021) observed negative associations with rote learning. In the context of home office users of enterprise resource planning systems, we might differentiate varieties of mind wandering which are harmful to productivity, such as by facilitating deliberate self-distraction, from those which may facilitate deep and interesting work. Seli et al. (2015) differentiated varieties of deliberate from spontaneous mind wandering, which might be insightful for differentiate harmful from beneficial mind wandering when using business information systems in home office settings.

To investigate this phenomenon, I propose a field study which can be conducted with a company partner who is interested in remote work. I propose recruiting between 200 and 300 participants to complete a series of 20-item questionnaires on their experiences of mind wandering throughout the week. Participants will report daily on their degree of experienced mind wandering, the varieties experienced, technologies used, the extent of workplace collaboration platform use, and their perceptions about their productivity. Ultimately, the findings could identify the potential impact of mind wandering on productivity, and insights into strategies for maximizing efficiency of home offices.

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SAP Integrated IIOT for Teaching

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Abstract

The connection between SAP and the manufacturing floor is abstract for students. This project aims to provide a concrete example of how SAP can integrate with manufacturing and how data collected from manufacturing processes allow for better planning and maintenance. The Candy Factory presented here is complete and ready for integration into classroom activities.

Keywords: IIOT, SAP, HANA, Process Mining, Preventive Maintenance

Introduction

Students in a classroom, when being taught about manufacturing integration, do not have any hands-on experience. They can enter a customer, place an order, etc., but when it comes to releasing the order for production, all that they can do is imagine the process. This is true both for regular classroom instruction and when playing ERPSim. The manufacturing process is nebulous with no hands-on component.

This project uses a small 'factory' that dispenses candy to create a better understanding for the students. This factory was assembled in-house of off-the-shelf parts along with some custom 3D-printed components. The factory is controlled by a Raspberry Pi that connects to SAP through Business Application Programming Interfaces (BAPI.)



Candy Factory Image 1

A candy mix was created in SAP as a new product with two raw materials and a packaging container in the Bill Of Materials (BOM) (regular M&Ms and peanut butter M&Ms.) The candy mix is set to use 30 grams of each. In classroom exercises, the students can follow through order-to-cash through plan-to-produce. Once an order is released to production, the students will see the candy factory start producing the final goods for that order.

The factory queries SAP through a BAPI for open production orders and any product customizations that may have been added, such as a different mix of candies.

The 'operator' of the factory is prompted to place an empty package container, which the factory then detects. The appropriate weight of each raw material is dispensed into the package container. The operator is then prompted to remove the package container and place a new empty one if any items remain in the order.

The raw materials used are then back-flushed using another BAPI, and the product is received into finished goods inventory.

During the factory's operation, process data are saved and stored in a Hana database for later use. Data points saved include time to complete each step, actual product weight, and raw-material usage variance.

While the original intent of this project was to introduce a hands-on component for manufacturing into the classroom, faculty can include many other aspects. These include:

- Production Variance Tolerance,
- Systematic Workflow Release Strategies,
- Inventory Control with EWM,
- Enterprise Asset Management,
- Integration with Fiori,
- Process Mining, and
- Preventive/Predictive Maintenance.

Conclusion

The candy factory is positioned to help students gain a deeper understanding of manufacturing integration and IIOT data collection. No longer will manufacturing be something that is just talked about in class; it will be something that the students can see and in which they can participate.

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Social Justice Solutions Using Enterprise Technologies

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Abstract

To attain sustainability goals as established by the United Nations 2030 Agenda for Sustainable Development, enterprise level technologies must be repurposed to focus on the needs of people. At least four of the 17 sustainability goals are directly related to community challenges created by mass incarceration. The concept of moral-money, or options for operating a socially responsible business, emphasize the need for a framework to design and deploy technologies that offer economy-level improvements to improve the lives of people. Current technologies such as SAP's enterprise offerings have been used to reduce costs and increase revenue streams in major industries across the world. A 2019 case study published through a joint venture between SAP and the State of Arkansas prison system confirms the opportunities presented when enterprise level technologies are used in social justice initiatives to improve the lives of people. This research offers a substantive contribution to the IS domain by using information systems to promote social responsibility in business.

Keywords: social justice, economics of information systems, moral money, mass incarceration, socially responsible business practices

Introduction

The design and business value of information technologies has been debated and studied for decades, in practice and in IS (Information Systems) research (Hitt & Brynjolfsson 1996; Kohli & Grover 2008; Melville et al. 2004; Tallon et al. 2000). Although most IS research is driven by interests in the economic returns of investments in technology, recent studies have extended beyond return on investment (ROI) metrics and extended defining the value of technology to its ability to address ESG (environmental, social and governance) reform (Ff, 2021). Although some efforts in using technology for social development are intentional, many efforts in this area are still a secondary outcome of an intended goal to reduce costs or increase revenue generation.

An example of an unintended benefit was presented in the report of a joint innovation between SAP and the State of Arkansas presented at the 2019 Sapphire conference. In this report (see "Reducing Recidivism with Technology, State of Arkansas and SAP Co-Innovation 2019"), SAP partnered with the State to address a growing prison population problem. Faced with the expectation to build a new billion-dollar facility to house an increasing number of offenders, Arkansas turned to SAP to develop a data-driven approach to reduce recidivism.

From this case study, Arkansas recognized an opportunity to "apply technology to this crisis" to produce two outcomes:

- 1) Create a comprehensive executive dashboard to guide strategy and data driven policymaking.

- 2) Create an operational dashboard generating real-time personalized program recommendations to improve offender outcomes!¹

What Arkansas realized was that the crisis was not an increase in dangerous criminal activity in the state. The problem was in fact a failure to consider how factors such as accessibility and poverty impacted decisions made to return paroled individuals to prison. As a result, a main outcome from the study was that many people violated parole because they did not have the means to contact parole officers in a timely manner.

The Prison Industry and Mass Incarceration

The United States incarcerates more people than any other nation, with about 25% of the world's prison population being in the US. At the time of this research in 2021, over 2.1 million people were counted as part of the prison population in the US, compared to about 200,000 in 1972.²

Mass incarceration in the United States has led to several issues, including overcrowded prisons, increased health risks and decreased psychological well-being. Additionally, the increasing number of prisoners is putting a significant strain on state budgets. Prison populations vary in each state, with the highest rates occurring in Louisiana and Oklahoma. State prison spending also varies greatly and can be as high as \$69,355 per inmate, which has been estimated as the average cost of an inmate in New York state.

In addition, data confirms that the justice system disproportionately incarcerates a large number of African American men. A 2019 statistic estimated the incarceration rate of African Americans in local jails was 600 incarcerations per 100,000 of the population, which is the highest rate of any ethnicity. Considering this statistic, what is often overlooked is the number of African Americans who are held under community supervision outside the prison system. In county jails, people are held for months before trial because they cannot afford an attorney and/or cannot post bail. Those with charges who are able to pay for their freedom fall under the category of "legal supervision" where they are required to report to local parole offices and are subjected to restrictions as posed by pre-defined rules and regulations based on tentative charges that have not been established through trial. In other words, this is a group of people who have not been tried in a court of law who must abide by rules and regulations set up by the justice system including paying for monthly supervision fees and location-based technology to track them prior to a court appearance. These fees partially pay for the system to operate; the balance is subsidized by government funding.

The misappropriation of technology in the justice system is largely overlooked and mostly unknown to the general public. Tracking technologies, surveillance technologies, and enterprise level prison management systems all support an industry that exists to incarcerate people.

In a statement made by Bill McDermott, the CEO of SAP during this time, the following determination was shared:

"Every time our customers turn their ideas into action, we help improve people's lives. Together, we can transform industries, grow economies, lift up societies and sustain our environment because it's the best-run businesses that make the world run better -and the best run SAP."

For organizations to extend the use of technology to focus on financial institutional goals while prioritizing the needs of people, intentional goals and strategies to create sustainable communities that promote human flourishing must be incorporated in the design and intended use of enterprise level technologies.

¹ See <https://documentcloud.adobe.com/link/track?uri=urn:aaid:scds:US:5687e738-0442-433a-8a51-9oe47e904dab>

² see <https://worldpopulationreview.com/country-rankings/incarceration-rates-by-country>

As an outcome from the Arkansas case study, SAP developed a framework to create a "purpose driven" government. In the report, the following statement was provided:

"Every organization is in a different place in its journey, but the goals are the same - to serve its citizens. With this in mind, SAP created a purpose driven framework to align its most innovative technology to partner with governments to tackle big problems."

Because governments and large corporations are leaders in the use of enterprise level technologies, SAP and similar companies have the opportunity to strategically design and offer technology to inform decision making that promotes human flourishing.

United Nations 2030 17Goals Agenda

In September 2015, the United Nations (UN) presented a framework of sustainable development goals (SDGs) to transform the world into an equitable environment for sustainability and human flourishing (see the [2030 Agenda for Sustainable Development](#)). In this effort, the UN adopted a new framework composed of 17 goals and 169 targets to wipe out poverty, fight inequality and tackle climate change over the next 15 years. Of the 17 goals (see figure 1), at least four goals share a common focus towards addressing the economic challenges created through mass incarceration:

GOAL 1: End Poverty everywhere

GOAL 8: Decent Work and Economic Growth

GOAL 10: Reduced Inequality

GOAL 11: Sustainable Cities and Communities



Figure 1: UN Sustainable Development Goals

Mass incarceration in the United States is a civil rights issue (Alexander 2010). Many argue that incarceration dehumanizes poor people and minorities, does not increase public safety, and damages already marginalized communities. The current justice system also promotes unethical practices and profit-based decision making. Currently it is legal for officers to misrepresent the facts of a case to increase the number of grand jury convictions of innocent people. Legal representation by attorneys emphasize plea bargaining where innocent people accept lesser charges to prevent facing a racially biased jury. Although many factors of the legal system violate first and fourth amendment rights, it is a money-making system that supports an entire prison industry and provides financial support for a network of private enterprise.

Technology Solutions

The most promising solution has been suggested by the SAP/State of Arkansas case study: focus on using technology to take care of people. This can be accomplished through several options to repurpose existing technologies to improve decisions that affect the welfare of communities. First, metrics can be developed and visibly presented in institutional dashboards to place these concerns at the forefront of managing the business environment. Second, the use of data analytics and artificial intelligence (AI) can support the need to make better decisions to end the incarceration of people who do not pose a danger to the public. Currently, African Americans are perceived as dangerous because they are incarcerated at a disproportionate rate. Equitable, people-serving technologies could displace the bias and profit-generating system that currently masquerades as a public service organization.

Conclusion

Enterprise level technologies offer opportunities to do more for people than to efficiently provide material needs. A balanced focus on sustainability of the needs of both businesses and communities of people would address at least four of the UN sustainability goals. Because advancements in technology currently exist beyond the capability to support existing business operations, considerations towards human flourishing can add balance to global economies.

This research offers a substantive contribution to the IS domain by using information systems to promote social responsibility in business. The concept of moral-money, or options for operating a socially responsible business, emphasize the need for a framework to design and deploy technologies that offer economy-level improvements to improve the lives of people.

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De-escalation of IS Projects: A Retrospective Reflection from Sixteen Years of Consulting at SAP

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Extended Abstract

Keywords: clinical research, reflective practitioner, IS turnaround projects, de-escalation

Numerous research papers have addressed the topic of escalating major information systems (IS) projects; though, few have addressed the topic of turning failing major IS projects around. Even fewer of this literature is informed by the direct experience of the authors as change agents seeking to de-escalate projects that have run out of control. In this paper, I report my findings as a retrospectively reflective practitioner, or clinician, drawing from projects that I led and successfully turned around. The study draws from not only my recollections as a participant observer, but also comprehensive documentation of the projects I was involved in over a period of 16 years with 15 requiring turnaround interventions. This study will focus on five cases to address the research question, *"How do enterprise system project consultants successfully turn a troubled project around?"* In the context of developing clinical research for IS, my objective is to reproduce actionable guidance for IS project consultants engaged with challenging projects.

Rather than selecting a specific theoretical frame for my study, I chose the general logic of dialectics to guide my analysis of data. Organizational change during the project implementation can produce problematic situations due to misaligned enterprise system functionality and business requirements (Davenport, 1988) and cultural conflicts and required organizational change management (Berente et al., 2019). These types of conflicts are known as dialectic where there is a pluralistic world where events and values compete for control (Robey, et al., 2002). As a component of reflective systems development (Mathiassen, 1998), dialectics is an appropriate framework for reflective project intervention.

In addition to dialectics, as a practitioner I heavily relied on reflection-in-action as Schon (1983) defines, "practitioners themselves often reveal a capacity for reflection on their intuitive knowing in the midst of action and sometimes use this capacity to cope with the unique, uncertain, and conflicted situations of practice" (p. viii). I also used reflection-for-action in advance of enactment and retrospective reflection-on-action after enactment (McAlpine & Weston, 2000).

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A Design Thinking case study: Net Promoter Score improvement for SAP-based education courses

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Extended Abstract

Project Management methodology for Enterprise Systems' implementation is a challenging topic for teaching that considers learning of several workstreams and hundreds of project aspects in a short period of a course timeframe. In the case of a considerably significant number of project managers as participants, it creates new challenges for the trainer, such as increased group maturity, less manageability, and raising the number of questions. A Design Thinking method is embedded into the course schedule to improve group collaboration, experience exchange, and course Net Promoter Score (NPS) at the end. The article describes the actual use case from an SAP course trainer's practice. The research is done in the areas of course program redesign and Design Thinking technics selection. After-the-session feedback is shared as well as Recommendations for the upcoming rollout to use further.

Keywords: Design Thinking, Risk Management, Management Education, Project Management, SAP courses, gamification, scribing, Enterprise Systems.

Introduction

The research was triggered by the unusual use case driven by high number of participants at the SAP training for project managers about implementation methodology. The standard training content consists of several workstreams and hundreds of project aspects in a three-day period timeframe. The training was scheduled to start on Monday, Tuesday was a public holiday, and Wednesday-Thursday was the second and third days of the course. On Friday of the week before the course, six participants were registered, and considering the recommended number of participants by SAP Education center for the training was from six to twelve, the training was confirmed. The unexpected things happened last moment, and ten new participants applied to the course, so the final number became sixteen. That was a high number for the trainer who was assigned for this course. At the end of the first day, some participants complained about the monotonous content, limited time for the questions, and boring trainer's presentation. It triggered the risk of a low Net Promoter Score (NPS) that is evaluated at the end of course. One day before the second day of the training was a holiday. To mitigate the risk of low NPS, the research was started to make the course's content and structure more interactive and appropriate for a significant number of mature project managers.

The research goal is to improve the NPS for SAP-based education courses considering many participants and monotone content. The NPS is calculated as an average score or participants evaluation of the training

from one to seven scale in the course's content and structure, trainer knowledge, and general feeling after the training. Research steps are to ideate and analyze available alternatives of the course structure and teaching method, develop the selected option, execute it, and analyze the results. The article is structured the same way.

Research and workshop preparation

Potential alternatives considered are trainer replacement, course cancellation, course content redesign, and changing the course format. The first option is not possible due to resources capacity. Course cancellation would cause a significant financial implication (most of the participants came from other cities) and more negative customer feedback. Course content redesign is time-consuming and required additional resources. So, the format changing is selected. The format changing should create the participant's experience exchange, increase team interaction, add attraction to the trainer-participants communication and keep learning the course content (Taratukhin 2020). Design Thinking (DT) workshop was selected as a format for the one day of the training. DT's role was shifted from new solutions to team collaboration around selected topics and applying new knowledge to practice (Dilts 1994, Prud'homme van Reine 2017, Dobrigkeit 2019). Existing science articles mainly cover DT appliances for the creation of new ideas (Carroll 2016, Taratukhin 2018, Cesar Pereira 2018, Corral 2018). In our case, it's used for education purposes. This appliance and technics compiling are defining the contribution to the science of this article.

Basso-Plattner Institute (HPI) defines six phases of design thinking taken as a basis for the workshop planning: Understand, Observe, Point of View, Ideate, Prototype, and Test (Plattner et al. 2009). According to the methodology, we adopted it for the research goal. Understand phase is based on the course content presentation. The selected topic is "Risk Management during the enterprise system deployment." The group of participants is separated into four teams with four participants each. For the Observe phase, we prepare the wallpaper with the different project phases. Participants lists various risks that can happen. Using the "Affinity Mapping" technique, it is map with project stages. For the Point of View phase, after the idea's prioritization "Deeper Discovery" technique is applied to the selected risks as well as "Stakeholder Map" and "Personas" excursions to prepare groups for the solution ideating (Gray 2010). For the Ideate phase, groups generate ideas about how to mitigate the project risks. After this phase, we apply the "Dreamer/Realist/Critic" technique to select the most valuable ideas (Michalko 2001). Prototype and Test phases are joined to the group's presentation and solution protection with a Questions & Answers.

We decided to invite a professional scribe who draw all the excursions materials before the session and summarized the session discussion results on one board before the workshop finish.

Workshop holding

Participants were notified the format change based on their demand and agreed on the new format. The workshop runs as expected with each participant's involvement and attention that demonstrates good structure and techniques selected for the workshop. Figure 1 presents two photos from the Point of View phase of the workshop.



Figure 1. Point of View phase of workshop

Figure 2 presents some of the scribe's art.



Figure 2. Art by invited scribe as a visualization of the session's outcomes

Results and discussions

The course's NPS is improved from negative feedback at the end of the first day to 6.8 of 7 scores at the end of class. Based on previous trainer's experience negative feedback is usually evaluated at about 1 to 4 scores at the end of the course. Getting a 6.8 score demonstrates that the risk of the low NPS was mitigated. The NPS is covering evaluations aspects of the course content and structure, trainer knowledge, and general feeling after the training. Our assumption that DT workshop supports the areas of course structure, trainer knowledge, and general feeling. Most of the participants commented DT session as a powered inspiration element of the session that allows not only to apply new knowledge on practice but also to build a strong network across participants. It demonstrates positive experiment results to continue research in including DT workshop to the program of SAP education courses in the groups with the high number of participants. More than an average number of participants also generates more revenue for the courses that can be spent for the DT session organization keeping the margin at an acceptable level. DT workshop organization

resources are one-day preparation and a one-day workshop for the following roles: DT facilitator for each group of 3-5 participants and a scribe.

New after COVID-reality moved most of the SAP training to the virtual space where keeping the group's attention became a significant element of the courses' NPS. Authors are expecting that holding a virtual DT workshop for the online courses gives positive results. This research does not pretend to be the all-cases solution but defines the direction for the following studies with various cases of DT appliance for education purposes.

Conclusion

Project Management methodology is a challenging topic for teaching. In the case of a considerably significant number of project managers as participants , it creates new challenges for the trainer, such as increased group maturity, less manageability, and raising the number of questions. Embedding a Design Thinking method into the course schedule shows improvement of group collaboration and course NPS increase. This change is suggested for the training with the complicated topics and averagely lower NPS score. This recommendation applied to the online format as the only available option during the pandemic period.

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