

# **Development and Evaluation of a Roleplaying Gamification Module for Deeper Learning in an Online Graduate Course**

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# Agenda

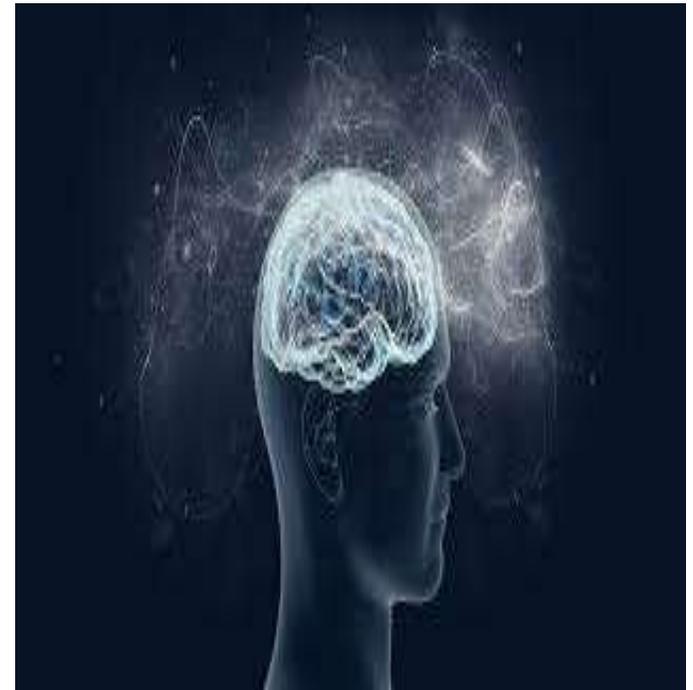
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- Background
- Study Description
- Example Web Pages
- Data Collection, Analysis, & Results
- Conclusion

# Background and Significance

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- **Cognitive rehearsal (CR)** (visualizing applying skills) can **increase skills self-efficacy** through vicarious experience (Delich, 2017; Finnesgard, Aho, Pandian, & Farley, 2016; Iheduru-Anderson & Wahi, 2017; Smith, 2013)
- Using cognitive rehearsal for teaching skills has been implemented through **role play**, and studied in social work, surgery, nursing and other students (Delich, 2017; Finnesgard et al., 2016; Iheduru-Anderson & Wahi, 2017)
- Although can be a powerful tool, CR can be hard to incorporate in online learning



# Background and Significance (cont.)

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- Wickersham and McGee (2008) proposed ways to incorporate **deeper learning principles (DLPs)** into online teaching, they encourage
  - Online curricula designers to induce “active learning” by using **real-world problems as examples**
  - “Engaged learning” and “engaged activities” by **providing choices** about how to use the online functions and **different ways to interact** with curriculum
  - Provide students with **independence** to self-set goals and self-manage online module utilization

# Background and Significance (cont.)

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- One way to apply DLPs to facilitate cognitive rehearsal is through **game-based learning (GBL)** (Crocco, Offenholley, & Hernandez, 2016)
- Few GBL studies focused on teaching higher education (HE) management students (Crocco et al., 2016; Dias, 2017; Maratou, Chatzidaki, & Xenos, 2016)
- None focused on cognitive rehearsal and roleplaying to improve online learning outcomes



# Background and Significance (cont.)

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- Though number of **HE online classes increasing**, researchers have most frequently studied DL in F2F settings (Pereira & Wahi, 2019)
- **Gap in literature** on how DL methods effect on online courses and how DLPs can be applied to encourage CR
- This study aimed to fill this gap





# Study Description

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- Study sample consisted of two consecutive online classes in Management Theory and Process (MGMT 9080) taken by students in Fitchburg State University's online accelerated MBA program
- Each class seven weeks long
- 113 students included in the classes
  - ❑ Fall A 2019: 61 students
  - ❑ Fall B 2019: 52 students
- Of 113, 96% (108) completed the assignment and included in study

# Study Description, cont.

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- Topics (management theories) covered in the course:

Unit (Week)	Topic	Case Study	Gamification Module
1	Scientific Management Theory (Classical/Taylor)	X	
2	Bureaucratic Management Theory (Weber)		
3	Human Relations Theory & Theory of X and Y	X	
4	Systems Theory		
5	Total Quality Management (TQM)	X	X
6	Agile		
7	Final Paper		

# Study Description, cont.

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- For TQM module under study, students could earn **extra credit points** if they completed the game-based learning (GBL) module **in addition to** reading the required case study article and reviewing the other required TQM course materials (posted articles and videos) before answering three essay questions
- Students could either
  - a) just read the normally required materials - case study and other TQM course materials **OR**
  - b) read the normally required materials **AND** complete the TQM online game-based learning module.
    - Purpose of GBL module was to **allow students to role play different perspectives of case study individuals** to induce **CR** and increase **DL**

# FSU Special Project Major Grant

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- Using funds from Fitchburg State special project major grant, worked with consultant to design, develop (program), and test module
  - Monika Wahli, DethWench Professional Services

# Graphical Depiction of Online Roleplaying, Gamification Module Flow

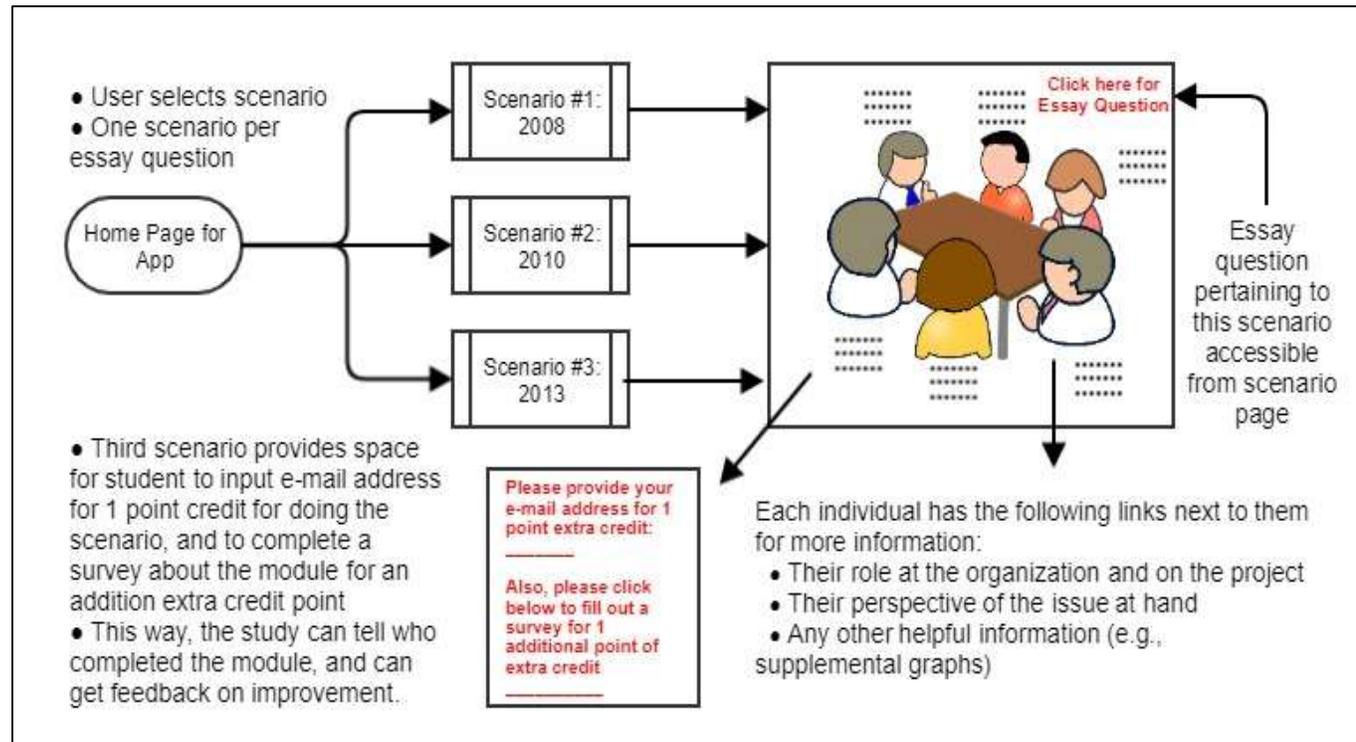


Figure 1. Illustration of simulation module flow

# Online DL Gamification Module

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- Module consisted of 5 webpages
  - ❑ Introduction page, incl. explanation text, case study, background resources, module learning objectives
  - ❑ Three scenario pages
  - ❑ Module completion page

# Introduction Page

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- Introduction also included description of five departments
  - Human Resources
  - Finance
  - Operations
  - Engineering
  - Customer Service
- Each department represented by a fictional executive with back story (total of 5 characters)

# Example Department Description and Character Back Story

## *Operations Department*

The Operations Department deals with all the logistics involved in the organization. This involves coordinating staff and equipment (including planes) to be at the right location at the right time. It also coordinates interactions between departments, such as ensuring policies and procedures by Engineering Department staff do not collide with the activities of the Customer Service staff.



CHIEF OF OPERATIONS, OPERATIONS DEPARTMENT  
MS. LOGISTICS/CHIEF OF OPERATIONS

The Chief of Operations is head of the Operations Department.

## **Back Story**

Ms. Logistics will represent the Chief of Operations in this simulation.

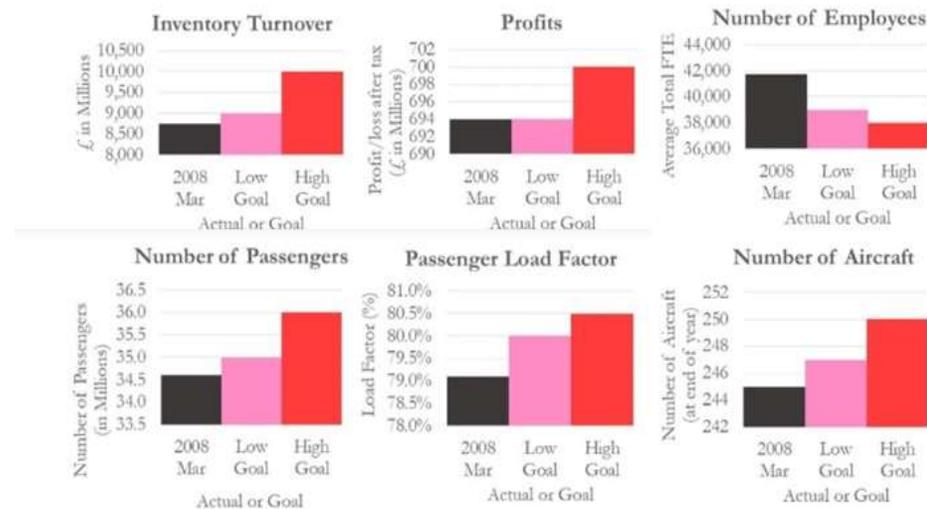
- Logistics comes from a family who ran a high-end transportation service, where they catered to luxury businesspeople with limousine service. Over the course of her childhood, they expanded into the taxi service, and when she was a teenager, she became a dispatcher.
- Logistics loved being a dispatcher, and when she went off to college, worked as a dispatcher at a trucking service. It was there that she formulated in her mind her dream job - coordinating shipments of inventory for a large, international network of retail housing goods stores. Many of the truckers shipped merchandise from these stores, and not only did she love the merchandise, the truckers spoke highly of the culture of the store and how they treated their customers, contractors and employees.

Figure 2. Example of online learning module introduction page description of department and executive leader

# Example Scenario Description

## ^ Scenario Description

This scenario centers around an Executive Team meeting that takes place in March 2008. At the beginning of the meeting, Ms. Saver puts a slide up for everyone to see. It includes the following: 1) current data about various BA metrics, and 2) two proposed goals for changing these metrics over the next year. One goal proposed is more conservative ("low goal"), and one is more ambitious ("high goal"). See them depicted in the image below.



Ms. Saver wants the group to discuss the following:

1. Which of these metrics should we target improving over the next fiscal year, in 2009?
2. For those that we target, what should be the new goal, and how should we work to achieve this goal?

Ms. Saver recommends that the group review the elements of TQM to use those to help guide the group in the discussion.

Figure 3. Example of scenario introduction from online learning module

# Example Scenario Character Thoughts and Dialogue

## *Operations Department*



CHIEF OF OPERATIONS, OPERATIONS DEPARTMENT  
MS. LOGISTICS/CHIEF OF OPERATIONS

### *Thoughts*

What stands out to me is that big red line heading down representing passengers. Those are our customers! Why is it so steep? It's almost like they are jumping off the planes themselves! I can't help but think it has something to do with our customer service, but it's not fair to place that on Lady Goodflight's department with no data. I also worry that in our haste to reduce the number of employees, we might have done away with employees we needed for our profits – like the people in marketing and sales. But the thing is I don't know, so I don't feel comfortable telling my coworkers that that's what the problem is.



### *Statement in Meeting*

"Everyone, I have thought really hard about this, and I have decided that I don't know why our profits are going down. But I could know – and we all could know if we gathered the facts. So I suggest that to solve this problem, we emphasize the element "fact-based decision-making". This means that we could do market research directly with customers to figure out why we're having fewer passengers. We are reducing the number of employees, and we could find out what positions were actually phased out. Maybe they are positions we need. I'll bet if we focus on gathering facts, once we got our facts, we all could easily decide on a pathway forward."



Figure 4. Example of thoughts and dialogue by a character in a scenario in online learning module

- Below scenario descriptions, each character provided their thoughts and actual dialogue said in meeting
- Audio for both thoughts and actual dialogue

# Module Completion Page

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- Module completion page
  - Short debriefing video – learning objectives & review of scenarios
  - Asked to click on link and fill out SurveyMonkey survey for extra credit



# Data Collection

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- Two data sets collected
  - ❑ Grade data from all students participating in the classes
  - ❑ Survey data from students who used module on their perceptions of (a) obtaining learning objectives and (b) module's technical performance

# Data Analysis

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- Quantitative analysis (R programming language)
  - ❑ Conducted **descriptive analysis** on data from all students in the classes and for Likert scale questions from survey
  - ❑ Compared proportion of students in Fall A and B who used module using **Chi-squared test**
  - ❑ Used **t-test** to compared students grades who used and did not use module
  - ❑ Conducted **correlation analysis** between TQM assignment score and final course score to assess bias towards higher performing students
- Qualitative analysis
  - ❑ Coded students' text answers into initial coding framework, from results, themes extrapolated for final coding framework (Burnard et al., 2009)

# Results: Descriptive Characteristics of Sample

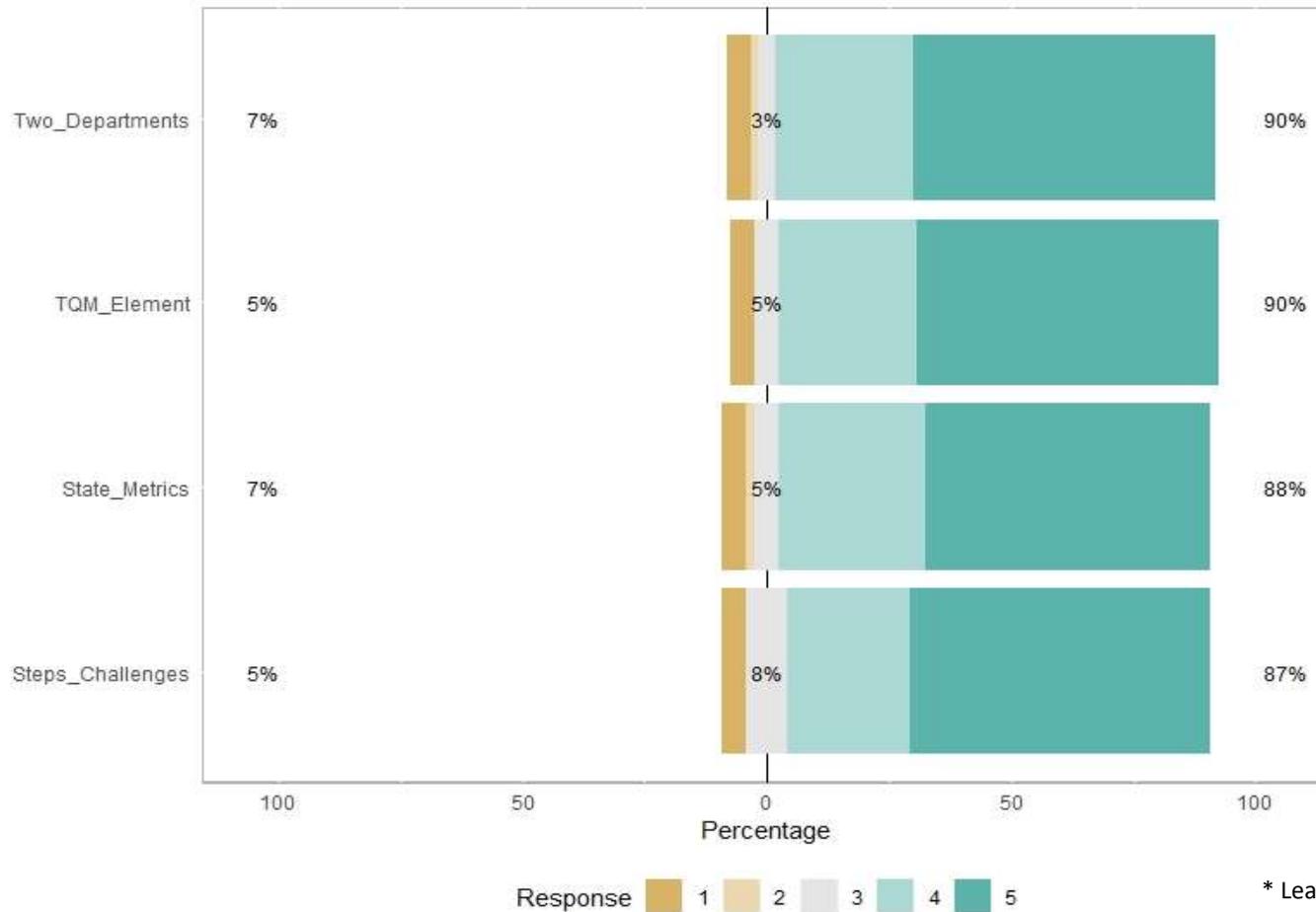


Characteristic	All (n = 108)	Used Module (n = 58)	Did Not Use Module (n = 50)	<i>p</i> -value*
Fall A (n, %)	59, 55%	30, 52%	29, 58%	0.9140
Fall B (n, %)	49, 45%	28, 48%	21, 42%	
Score on assignment (mean, sd)	22.5, 2.7	23.4, 2.2	21.5, 2.8	0.0003
Score in course (mean, sd)	94.3, 5.8	96.5, 4.7	91.6, 6	<0.0001

Note: \* For categorical test, chi-squared test was used. For continuous test, t-test was used. sd = standard deviation

Takeaways: Of 108 students completed TQM assignment, 54% used module & submitted survey with feedback  
 Average score on essay was sig. higher for students who used the module compared with those that did not  
 Those who used module had sig. higher average score in entire course suggesting at least some bias

# Likert Scale Results: Students' Perceptions of their Learning Objective Achievement\*



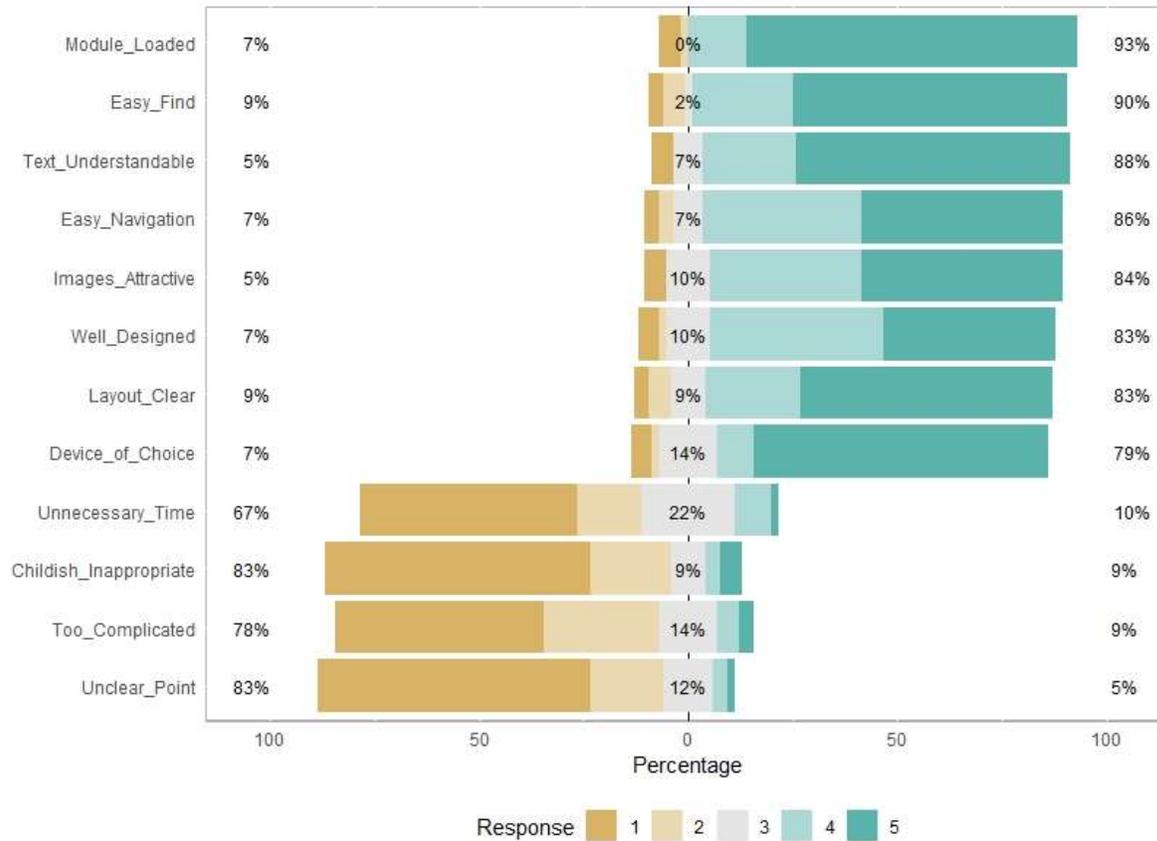
- Students felt the module helped them achieve learning objectives
  - Between 87% - 90% indicated that it helped them learn “a lot” or “a little” for each objective

Figure 6. Likert scale plot for course objective statements. Response codes: 1 = Did not help me learn at all, 2 = Did not help me learn very much, 3 = Neither helped nor did not help me learn, 4 = Helped me learn a little, and 5 = Helped me learn a lot. Labels and their learning objectives described in Table 4 below.

### \* Learning objective descriptions

Label	Learning Objective
Two_Departments	Describe how two different departments in the same global organization might implement the same TQM element differently in order to improve quality.
TQM_Element	Identify a TQM element that could guide a management intervention at an organization designed to improve quality, and state your rationale as to how the element could guide the intervention.
State_Metrics	State at least two performance metrics that could be measured about an organization, and explain how they could be changed through a management intervention.
Steps_Challenges	State one of the steps to implementing TQM, and describe challenges that may be associated with this step.

# Likert Scale Results: Students' Perceptions of Technical Performance



- Between 79 - 93% responded “somewhat” or “strongly” agree to questions where agree indicated positive direction
- Between 57 - 83% responded “somewhat” or “strongly” disagree where disagree to question indicated positive direction
- No overwhelming technical issues identified
- Asked if module should be used in future classes
  - 32% required
  - 64% extra credit
  - 3% not used

Figure 7. Likert scale plot for technical performance statements. Response codes: 1 = Strongly disagree, 2 = Somewhat disagree, 3 = Neither agree nor disagree, 4 = Somewhat agree, and 5 = Strongly agree. Labels, student statements, and positive or negative indicators described in Table 5 below.

# Qualitative Survey Results: Final Coding Framework

- Comments relate to one of three categories
  - Electronic format and its components (changes requested and positive feedback)
  - Content of module (changes requested and positive feedback)
  - Feedback about other areas
- Main themes
  - Format: module confusing because much of content hidden behind collapsible accordion controls manually opened by users
  - Format: module should be professionalized
  - Content: evidence of CR, able to relate to characters, finding helpful characters roleplayed what they thought, and said at meetings
  - Content: liked audio and video, and requested more (although others expressed too much content, too long)

Format		Content		Other Areas of Feedback
Change Suggested	Positive Feedback	Change Suggested	Positive Feedback	
Use images of real people	Well-designed	Need broader incorporation of topics into module	Relatable	Some found module confusing and/or too long
Design needs improvement	Easy to navigate	British accents and higher quality audio	Liked thoughts and dialogue	Some requested module for other topics
Add interactive features	Good module flow	Difficult typing case study to characters	Helpful details including charts and examples	Found it to be an innovative resource/would recommend
Problems with scrolling and auto-collapse		Add more audio	Background helpful	Need to be clear about assignment (grading, extra credit, deadline)
Separate resources from module		Too much background	Helped understanding of the topic	
Improve navigation		Add more video	Helped envisioning applying the theory/roleplaying Helped answering the essay question Multiple uses helped understanding	

# Example Students' General Comments

"I completed the extra credit [module] on Wednesday, and worked on my questions the following Friday. At first, on Wednesday, I didn't see how the [module] would benefit the case study. However, when I was answering the questions, I found it very helpful."

"I wish this type of case study appear[ed] more in other classes because it certainly stimulated my thought-process while absorbing how those management styles/approaches would apply in the real world."

"I found the module extremely helpful. The last module was my favorite since it broke down each strategy and the steps. I really do feel like I learned a lot and better understand how to apply!"

"In my humble opinion, Week 5's Case Study is even more interesting given the extra credit piece. I finished [the] Week 5 Case Study in Week 4, but re-wrote many parts after going through the DL resource."

"The simulations were great. I find when developing an informed opinion it helps me to seek council. These modules provided that, which provided me a much stronger understanding of the material."

"The simulation part was very helpful, because helped [me] to understand each department and their points."

\*Most students suggested module helped better understand the material

# Example Students' Suggested Improvements

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"A (big) company usually has an organizational chart. It would be helpful to see which executive reports to whom."

Note: org link was provided on Bb site

"The module could be more interactive with the user to gauge learning and comprehension."

"All parts of the module should have [audio component]. ... seem to stick if I listen to content than just reading it off the page. At least this is important to me as I study."

"Fewer drop down arrows. Basically, I had to click quite a few times to read the content."

# Conclusion and Recommendations

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- Developed an online roleplaying, gamification module to teach management theory to HE MBA students
- The approximately 50% students who used the module reported evidenced of deeper learning (DL) and engaging in cognitive rehearsal (CR)
- More studies of online methods to increase DL and CR for applied learning in HE should be conducted due to rapid conversion of F2F to online classrooms taking place in HE
- Article under first edit at Online Learning Journal

# Questions/Discussion

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