First Tasks: an Activity to Help Students Understand Themselves and How to Improve Team Management in Information Systems Projects

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Abstract

This paper presents a teaching activity and corresponding data and analysis used to teach students about the difficulties of task initiation and prioritization during teamwork when facing multiple task options. The activity has successfully led to rich introspection and discussions of how to motivate creativity and interaction when managing oneself as well as teammates. The three parts of the activity begin with reflection and commitment to individual ideas, followed by un-freezing in a 5-minute social task setting, ending with a reflection and joint analysis of results related to the tasks in the un-freezing activity. The goal is to set a new and improved task model in the minds of participants. The design of the 10 tasks in the un-freezing activity is carefully balanced to vary several trade-offs in task varieties as they are perceived by participants. These are the degree of social interaction and interdependence, the degree of physical activity, the degree of open creativity needed, the degree of outcome discretion and potential judgement, the degree of explicit value, and the degree of fun. Results from 11 runs of this activity in two different universities with both undergraduate and graduate students over a two-year time period indicate that the activity is robust and may be helping to improve early project task engagement in Application Development classes.

Keywords: Task Choice, Teaching Activity, Project Management, Teamwork.

1. INTRODUCTION

While we have long known that team members must prioritize different types of tasks in order to initiate, sustain, and complete their joint work (McGrath, 1991), we have little to no empirical evidence concerning how individuals decide on starting tasks when they have multiple task types available. This is particularly important in technology innovation projects, because they include a wide variety of tasks and resulting task uncertainty hampers progress (Tatikonda & Rosenthal, 2000).

Some practitioner guidance indicates that starting with production-oriented, short-term tasks at the beginning of teamwork can improve success by focusing teams on tangible immediate outcome creation, which builds a shared sense of purpose and efficacy (Katzenbach & Smith, 1993). While this advice may be correct, it is unclear what would impede progress when managers attempt to organize their teams toward production-oriented, short-term tasks. Would all employees just follow as directed? Unlikely, because individuals in information systems development projects do exhibit task type preferences (Bradley & Hebert, 1997). It is also unclear what predispositions team members will bring with them when approaching starting their tasks, as they are likely to vary in how the select tasks from the variety they initially face. This element of volition in task choice aligns with more recent work examining how teamwork aimed at creating new products gets varying value out of collaboration technology usage depending on

what types of tasks are being attempted (Bala, Massey, & Montoya, 2017). Old calls for exploration of volition and interactions between individual knowledge and motivation in group task settings (Locke & Latham, 2004) have largely gone unheeded, particularly in relation to pursuing teamwork - shared goal-oriented work with planning and intentionality (Achtziger & Gollwitzer, 2018). We argue that these calls remain relevant both for research and teaching.

For students learning about ISD, standard curricula omit the importance of focusing on individual motivation systems within team task prioritization, whether from a systems analysis and design perspective or a project management perspective (Topi et al., 2010). Instead, current programs tend to focus more on building software and pulling and analyzing data with a minimization of attention to human factors concerns in work design (Clark, Clark, Gambill, & Brooks, 2017). While other classes might cover this content, leaving it to chance is risky, as students are unlikely to get a chance to have retrospective analysis for reflecting on their choices in a group activity otherwise. And, the inclusion of retrospective analysis of group choices is one of the key research elements that has the most promise for driving learning and has been most absent in studies of task volition and motivation (Locke & Latham, 2004).

This work developed a pedagogical activity called "First Tasks" for capturing first task choices within a group setting in class to enable retrospective analysis and develop better ISD management skills. The following paper presents that tool as well as the data resulting from that tool, which are presented as a research finding contributing to the body of knowledge on task volition and motivation, specifically regarding how people go about choosing their first tasks when confronting new work under time pressure, a scenario likely to directly mimic conditions faced in ISD projects in practice.

2. ACTIVITY DESIGN AND MOTIVATION

Work tasks come in various types with known dynamics that impact workers' ability to complete them. Among these dynamics technology innovation projects are likely to include some of each type (McGrath, 1984), leading to uncertainty that can impede progress (Tatikonda & Rosenthal, 2000). Tasks may be independent. Some may impact other people, and some may rely on others to provide input. This last variety of tasks require coordination and are the most likely ones people will avoid if given a chance (Straus & McGrath, 1994), yet the ultimate success of innovation projects depends more on whether and how team members communicate rather than how they are motivated (Bala et al., 2017; Monge, Cozzens, & Contractor, 1992). Communication entails risks of embarrassment and being judged, which in turn cause some people to inhibit themselves and avoid communicating (Frey, Gouran, & Poole, 1999).

Coordination task burdens may not be the only reason people make task selections. Some people may also attempt to start with minimal complexity in order to achieve task closure quickly if facing time pressure (a typical condition in actual technology work situations) (Straub & Karahanna, 1998). Yet other motivations may exist whether related to apprehension or not, such as evaluations of the ultimate utility of given tasks when prioritizing (Yeh, J. Willis, Deng, & Pan, 1999). What they are and how they will operate when jointly judged among a variety of choices and motivations is unclear. We could find no study that systematically varied these factors simultaneously to examine how they interact. Additionally, the learning opportunity seemed very large, since recognizing risks and personal communication-related motivations through reflection on behavioral experiences can assist in reducing this apprehension in oneself and among those one manages (Beatty & Pascual-Ferrá, 2015).

To make this apprehension and any other related task choice factors when confronting a variety of options visible a scenario can be deployed in which the subjective choices operate and require real selections (rather than hypothetical) (Stephenson, 1993). Such an activity would then make the choices available for explicit analysis and discussion. To accomplish this end, a 3-part activity was designed to have students reflect individually, experience their own subjectivity in action, and then reflect again collectively. First, students spend 5 minutes examining and explicitly identifying their own task models (Appendix 1). Second, they have 5 minutes to complete 10 tasks on a single sheet (Appendix 2). Third, they calculate their results and document them, sharing their first tasks on a shared board as an initial point for discussion (Appendix 3). The presumption was that reflecting on how people (including oneself) vary in their motivation systems for initiating first tasks would improve rates of project engagement during earlier stages of class projects later in the semester.

ISSN: 2473-3857
v5 n4904

3. METHODOLOGY

The overall methods employed in the development of this activity were experimental using reflection on one's operant subjectivity through visualized, collective feedback and reflection. These methods merged best practices for high-impact learning via collective, objective, personal reflection pointed toward an immediate application domain (Hattie, 2008; Maki, 2012; Meyers & Jones, 1993) with guidelines for surfacing operant subjectivity (Brown, 1980). To affect this goal, students began with an individual reflection so that they would commit to their initial thoughts without others influencing them. Next, they would complete the timed tasks. Finally, they would share that their first tasks were in a chart all could see. At first, this part was done on a shared white board. Later, an instant polling tool (polleverywhere.com) enabled instantly building a chart.

The final activity was the structured reflection survey at the end of the activity, which enabled data collection and reflection to feed the discussion that followed. (see Appendix)

4. DATA AND RESULTS

Some students assume that everyone thinks like they do. The results of first task choices from 165 graduate students and 95 undergraduate students in 11 different classes at two different universities in two different regions of the US collected in 2017 - 2018 indicate that there is significant variance in first-task choices (figure 1).

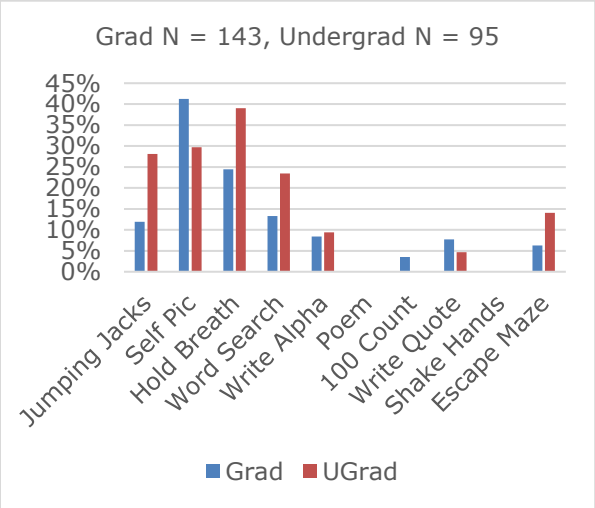

Figure 1 First Task Choices

More than a quarter of undergraduates (28%) seem to just "go-with-the-flow" and accept the tasks in the order presented (ie. begin with jumping jacks). Graduate students (average age 29) are much more likely to strategically choose their first task from among the 10 options as indicated by them not just selecting task one as their first (Appendix 2). Meanwhile, a deeper look at the jumping jacks non-starters shows that only 9% of them will go back and attempt the jumping jacks later. Most will not go back to this task, perhaps an indication that their motivation is not just about time. Also, among those selecting jumping jacks, less introverted students are more predominant as 50% are students indicating no introversion versus a population with only 34% students indicating no introversion. Note that no one choose the poem nor shaking hands as their first tasks. See the teaching note concerning why not (Appendix 4).

Overall, very few people even attempted the poem or the hands shaking, while almost all held their breath and tried the word search (figure 2). Both of these are tasks fully within the control of the respondent and not subject to outside judgement (ie. the self-picture is open to judgement if viewed by others). The word search and maze are both fun games. Fun played a role in the first choice of these tasks among those choosing them. However, since the word search was impossible, it raised some angst among those attempting it.

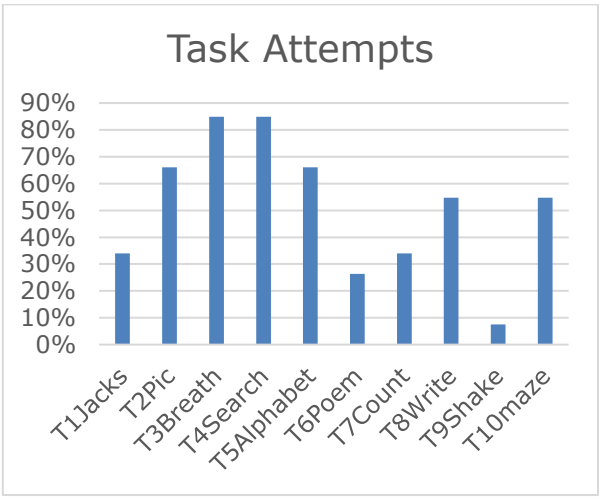

Figure 2 Tasks Attempted (% who tried each task)

A very small number of respondents (3%) correct the misspelling in the search and count the points in their scores. Another small portion (10%) go ahead and count the word search points in their scores even though they could not find all of the words. This is a sign of task outcome judgement leading to task modification in order to achieve

ISSN: 2473-3857
v5 n4904

closure, since the instructions specifically indicate no points can be earned without finding all of the words.

When asked in the open question in part 3 (Appendix 3) why they choose their next tasks, three major strategies emerged. Among them the most popular was that 41% indicated they looked for tasks that would be easiest for themselves. Next, 34% indicated that they would optimize the value (ie. points versus time commitment) in their selections. Finally, 19% just went in order. Several additional answers accounted for a variety of other approaches within the final 6%. But, when they were asked why they chose not to do specific tasks, 59% thought the major driver was estimations that a given task would take too long. This disjoint was interesting in that it did not symmetrically mirror the reasons for choosing tasks, implying that managers cannot assume motivations to be consistent concerning why to do versus not to do tasks. A very small portion of students indicated (9%) a more advanced task value optimization strategy of looking for tasks they could multi-task in their selection process. These students also earned 16 more points on average and tended to be female by a ratio of 2:1. This is a large variation, since the average number of points a respondent earned on this activity is 49.

The ultimate goal of the work included improving early engagement rates in student project work. While objective data were unavailable in some of the classes in which the activity was used, some classes used tools like Github to capture code changes or Trello to capture task completions. These data gave an objective measure of team task completion rates at any given time in their projects. You can see a sample analysis of this data in two course sections (N = 66) Figure 3.

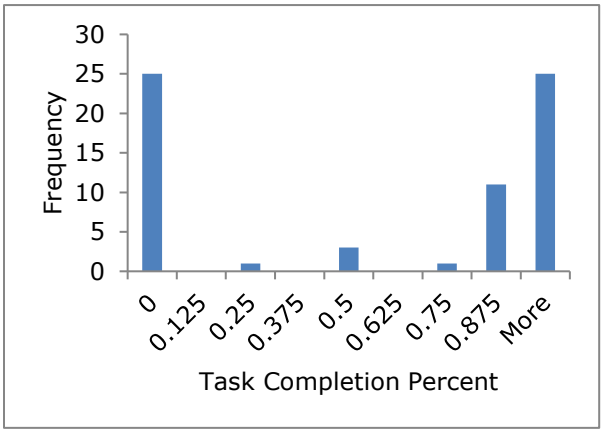

Figure 3 Project Tasks Completion Rate as of 3rd Week out of 4-week Project

This result was compared against third week completion rates in a section of the same course taught the prior semester by a different faculty member without the First Tasks activity. While there are many other factors uncontrolled between the two different sections, midpoint project engagement in the First Tasks sections totaled about 60% of students with most tasks completed, while the estimate in the other section was 40%. Perhaps this activity helped. Future research should better standardize these measures of task achievement in the projects to improve comparability of the outcomes in the control versus the experimental groups. Further work could also be done to apply this activity in industry to explore how work practices of managers and workers change due to increased understanding of task initiation motivations in group settings.

5. CONCLUSIONS

Information systems (IS) projects commonly occur in IS curricula. Team development support and training can help improve how students engage in these projects during their time as students and later in their careers. This short activity has proven useful over the past several years in improving understanding of how people interpret and prioritize tasks, and it can be run in as short as a 45-minute portion of a course. Thus, without taking too much time, faculty can use it to improve the managerial thinking of IS students.

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ISSN: 2473-3857
v5 n4904

APPENDIX 1

Activity Part 1: The Nature of Tasks and Time

INTRODUCTION

In projects, we often operate under time pressure. Time pressure leads to interesting human behavior! This activity will get us to observe this kind of behavior and think more carefully about tasks and how we decide to devote time to them in such a setting. We will also reflect on what causes us to prioritize different types of tasks in relation to complexity and interdependencies with other people. As a bonus, this activity will help us get to know each other and ourselves a little better.

REFLECT ON YOUR TASK MODEL

Take a moment and reflect on your own beliefs regarding tasks and time management. You have had many experiences getting things done, perhaps missing deadlines even! What do you tend to prioritize first?
The set of **your beliefs** about tasks and time is your task model. It explains what kinds of things you prioritize, how you prioritize, how you keep track of what you do, when you are willing to bend the rules, how well you get things done under pressure, your ability (or not) to add tasks in the middle of a busy piece of work. For example, one person's task model might always prioritize family member needs regardless of other things happening in their life. Another's may not like changes once a project has been defined and started. What are the key rules for you? What motivates you to get things done? What do you tend to prioritize first when starting a team project? Briefly, answer these questions by writing a paragraph describing your ***task model:***

ISSN: 2473-3857
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APPENDIX 2

Part 2: Task Prioritization

We will have 5 minutes. Complete this list of tasks. Try to earn as many points as possible. (100 points possible)

1. Do 20 jumping jacks. [5 points]

2. Draw a picture of yourself. [5 points]

3. Hold your breath for 30 seconds. [10 points]

4. Find the following words: [15 points]

Agenda

Alert

Clocks

Priority

Study

Timer

Todolist

R	A	G	E	N	D	A	S	T	R	Y
S	K	C	O	L	C	N	D	O	E	T
L	T	R	E	L	A	N	P	D	T	I
B	X	U	G	D	E	R	T	O	N	R
J	K	R	D	M	I	I	I	L	M	O
D	M	I	H	I	M	I	R	I	C	I
T	T	U	N	E	J	P	V	S	H	R
Y	A	I	R	B	S	T	U	T	Y	P

5. Write the alphabet from A-Z in all upper case and in all lower case. [10 points]

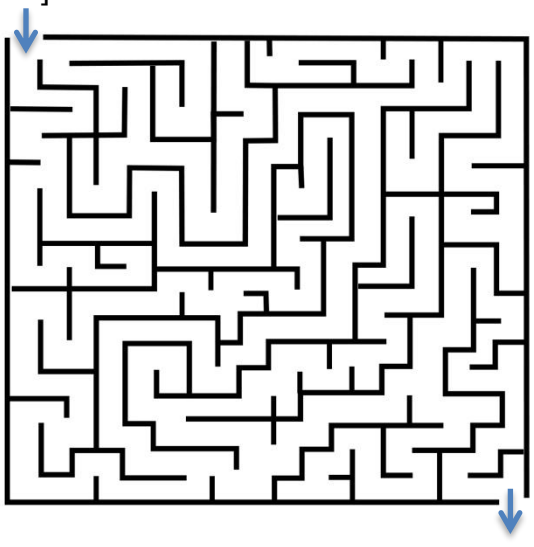
6. Write a 4 line poem so that the first line rhymes with the last, while the middle two lines rhyme with one another. [10 points]

7. Count to 100 aloud. [10 points]

8. Write “I will manage my time.” 10 times. [15 points]

9. Shake hands with 10 people in the classroom. [5 points]

10. Draw your escape through the maze: [15 points]



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APPENDIX 3

Task Model Test Results

Which task did you do first? (circle one)

1Jacks 2 Pic 3 Breath 4 Search 5 Alphabet 6 Poem 7 Count 8 Write 9 Shake 10 Maze

Why did you do that task first? (explain briefly)

Which task(s) did you attempt? (circle all you attempted, even if you did not complete)

1Jacks 2 Pic 3 Breath 4 Search 5 Alphabet 6 Poem 7 Count 8 Write 9 Shake 10 Maze

How many points did you earn in total? _____

Did you notice the points when you started? (circle one)

Yes A Little No

What do you think makes people choose what to do first? (explain briefly)

What caused you to not do the tasks you did not do? (explain briefly)

What made you select the next tasks you completed after the first?

Did you complete the word search? Why or why not? If you did, how did you do it?

How tired are you today?

Very A little Not at all

How stressed/anxious are you today?

Very A little Not at all

How introverted are you?

Very A little Not at all

APPENDIX 4

TEACHING NOTE FOR THE NATURE OF TASKS AND TIME

The goal is to surface personal views on task priorities, especially in relation to dealing with motivation systems, ambiguity, failure and social settings (interdependency and apprehension) for task execution. Only 85 points are actually possible. By surfacing the views and examining the explicitly students will become aware of their own motivations in more detail as well as the larger picture of how teams form based on individuals performing tasks. They will learn some strategies for detecting patterns and addressing them. Begin by having them each individually fill out Part 1 for 5-10 minutes. They need to write their answers so that they will commit their ideas into explicit statements for later reflection.

As they do Part 2, be sure to indicate to them when 1 minute remains. Call time and don't let them continue after 5 minutes.

After they do Parts 1 and 2, have them complete Part 3 individually then launch the discussion. First, debrief them on Part 2 using the questions for discussion after part 2 listed below.

These questions will elicit some of the variation in the group. You may encounter that some of them are introverted and would not therefore do the handshaking on their own or would be unwilling to count aloud because they do not want to disturb others. For others, the disruption is secondary to getting the task done. Some will also indicate that they chose tasks because they are good at them (comfortable). Some may indicate the opposite (get it over with). Ask if they built their prioritization strategy around point maximization or not. Some will have. Other will have missed that entirely. This is a sign of paying attention to the explicit value of the tasks. What did they do at the 1-minute warning? Anyone feel some panic? Why? Panic disrupts productivity and causes lower quality work in general. Do they like panicking as part of themselves? Had they thought ahead about how long different tasks would take in prioritizing them?

All of these dynamics expose their task models as they relate to getting tasks done in groups. Personality, skills, preferences all intrude. So will some of the social dynamics like anxiety or apprehension about communicating, (ie. not wanting to disrupt others or hoping others would be ready to shake hands at the same time).

You can pivot this discussion several different ways. It can be used to get into how to best write and present tasks for different types of groups/workers. It can also open up exposition of internal dynamics in the classroom by having the class move to different sides (physical scatterplot) to indicate where they fall on the questions above. This can then be used to talk about workplaces and variability of worker task models and how to best include differing task models into a single team. It could be extended into group formation. Finally, you could assign them to revisit their task models for homework and submit a more detailed version reflecting on what they learned in this activity.

QUESTIONS FOR DISCUSSION AFTER PART 2

Have them complete part 2. Then, have them complete part 3. After that collect their answers to what they did first onto a shared chart everyone can see. Then, begin discussing their results.

Motivation Systems: Did they pay attention to the points and stated "goal" of getting as many as possible? Did that inform where they started? The common starting tasks are drawing the picture and holding one's breath. Before you go further, ask why. Did they multi-task these? How many noticed the points when doing this activity? (usually about 2/3 do) How many just did the tasks in order regardless of 'value'? (usually about ¼ do)

Failure: Students cannot find "study" in the word search because it is misspelled as "stuty." It is an undoable task. Will they recognize that and move on? Will it waste their time? How will they respond to that problem? Be aware that some students may get agitated about this aspect of the activity. Note to them that there are tasks that seem fun and achievable up front that are actually impossible as specified. Pivot the discussion toward strategies for discovering and dealing with impossible tasks. Some people will have gotten stuck and wasted a lot of time. Others will quickly move on and come back later if time permits. Some will systemically prove the task is not possible by analyzing every "s" then correcting

your mistake. This is an analog to persistence and creativity but also perhaps subversion and cheating. Imagine a vendor on a project team hiding the fact that a task was not actually doable by making it look done. This happens with some frequency. The process is important. If they explicitly recognize the task problem and bring it up for discussion and redefinition during discussion, their response is less likely to seem like subversion and cheating.

Ambiguity: did they write the poem? Why or why not? Have 2-3 volunteers read their poems aloud and thank them for doing so. This is the most generative task with the most open possibilities for what a successful outcome could be. This leaves its result open for judgement and therefore apprehension for those not wanting to be judged. What makes them more comfortable trying this task? Did hearing a few people read their poems help them feel like they might attempt it next time?

Social Settings: What did they do about shaking hands with 10 people? It can be disruptive, and it also requires cooperation. How do they manage that? How many actually even attempted it? Were others upset about being disturbed to shake hands? Did they also avoid jumping jacks due to not wanting to be embarrassed in front of others? What about counting aloud? Did they whisper it so as to avoid disturbing others? Why? The task was assigned to everyone. What makes them more comfortable attempting any of these socially involved tasks?

Competitive Advantage Management Connection: Summarize the discussion by pointing out that information systems projects are often creating new capabilities and new digital systems. Doing so especially requires teams to engage in collaborative, creative tasks. Note that these are exactly the sorts of tasks people will avoid when under pressure or left to their own devices. Ask them to come up with ideas on how they might form their own teams now as students and later as managers so that the members, including themselves, are more likely to engage in the collaborative, creative tasks. Have them share some of these, especially probing on whether just mandating writing a poem or doing jumping jacks or shaking hands did not cause people to do it in the activity in case someone happily settles on command and control as their answer.