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Group Flow in the BYU Animation Studio

Jana Lynn Duncan

A dissertation submitted to the faculty of
Brigham Young University
in partial fulfillment of the requirements for the degree of

Doctor of Philosophy

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ABSTRACT

Group Flow in the BYU Animation Studio

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This dissertation encompasses three articles concerning Sawyer's (2007) theory of group flow in the context of higher education, including a literature review, and two interpretive studies. In the literature review and in the first interpretive research article, the results of the research illuminated the applicability of themes of group flow in collaborative settings in higher education in themes of vision, ownership and contribution, and communication. The final article provides a description of the roles of student lead and professor in this environment and the unique ways that they may have encouraged those themes in the studio.

The context for this study was the BYU Animation Studio, using video footage of students working in the computer lab, in their *Daily meetings*, and video interviews with students and professors in the program. The footage focused on one year of the senior project, with a core group of students coordinating efforts to create an animated short. Students involved in the senior film were mostly juniors and seniors coming from different academic departments, including Fine Arts, Engineering, and Computer Science.

In the descriptive article, we gained further insights into the experience of group flow in a higher education setting. Several of the themes from the data resonated with the literature on group flow. Students working on the project had both project and people-oriented goals. They took initiative to solve problems and work through personal conflicts with group decisions, and made efforts to share their knowledge with other students. As group members communicated, they often validated and built off of others' ideas, putting the interests of the group above personal interests.

In the same context, using the same methods, we were able to observe ways that student leads and teachers tried to enhance the group experience. Student leads and teachers made different contributions in that respect. Student leads contributed the actual project vision, breaking up the project into tasks for which students could volunteer and take initiative. Student leads also promoted friendship and communication within the group. Professors taught collaboration skills, and supported student initiatives. Professors also provided opportunities for students to collaborate across departments, while practicing collaboration between faculty members.

Keywords: group flow, education, creativity, collaboration, innovation, flow, studio, inter-departmental collaboration

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Although I was the primary author for this dissertation, it was the work of many. I dedicate this dissertation to family members who watched my little girl so I could work, to family members who prayed for me and encouraged me, to the wonderful professors who have supported me and counseled with me. There were so many people I could mention who have made this dissertation possible, and I dedicate this dissertation to them.

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DESCRIPTION OF RESEARCH AGENDA AND DISSERTATION STRUCTURE

Recent conversations in creativity acknowledge that what can be accomplished by groups can sometimes be more creative and more useful than what can be accomplished by individuals (Linder, Jarvenpaa, & Davenport, 2003; Montuori & Purser, 1999; Sawyer, 2007). Also, what some previously thought to be the work of individual genius is now being attributed to groups (Bennis & Biederman, 1997; John-Steiner, 2000; Paulus & Nijstad, 2003). However, it is also generally acknowledged that not all groups are inherently creative or successful.

For many years, research in creativity was focused on the creativity of individuals (Guilford, 1950; Sawyer & DeZutter, 2009). In the 1970s, Csikszentmihályi started researching individual flow, which was found to be positively related to creativity (Csikszentmihályi, 1996; Sheldon, 1995). More recently, after observing flow within groups of jazz musicians, Sawyer (2007) proposed that similar conditions could be applied to groups, leading to a state of group flow, which might lead to increased group creativity and productivity.

Unlike in individual flow, there are certain principles for group members and for communication that allow for group flow. Sawyer (2007) suggested 10 conditions for group flow, which we have summarized into three main themes for discussion: vision, ownership, and communication. Sawyer discussed each of these vaguely, and not much research has been done to try to establish these conditions as unique identifiers of group flow. Also, the studies that have been done have been limited to studying group flow in sports and creative music-making groups instead of more task-oriented, goal-driven creative groups.

Today, it may be more important to consider the group rather than the individual, because of the demand for group cohesion and group productivity to produce a competitive product. Sawyer (2011) suggested that while most collaboration research focuses on the inputs and

outputs of creative group work, group flow could be an insightful lens through which to study the quality of actual group interactions that go on during the creative process. In addition, the theory of group flow could provide a framework for extending existing research on individual flow to examine flow within groups. However, there is currently very little research on group flow in collaborative environments other than musical composition and theatrical improvisation. And while creativity has been shown to accompany individual flow, there are even fewer studies that discuss the relationship between group creativity or productivity in group flow.

Recognizing the value and the need for groups to achieve a higher level of creativity and preparation for industry, several universities are creating studio environments to give students experience in working productively in collaborative groups (Haring-Smith, 2006). The BYU Animation Studio is a university creative and collaborative setting that has had more than 10 consecutive years of success in producing award-winning animation shorts. Their unique studio setting involves an open lab, a student-driven environment where students converse, ask each other questions, and receive constant feedback on their work. In this setting, student leaders naturally emerge based on expertise. In addition, the studio meets regularly to present individual work to the entire studio group for discussion and collaboration, and to align to the overall vision of the project. This process, with the intended presence of vision, ownership, and communication, along with their record of creative products acknowledged for their quality by their field, suggests that this group may be experiencing some level of group flow. Thus, the BYU Animation Studio was an ideal setting to study to shed some light on Sawyer's (2007) theory of group flow.

The purpose of this research is to observe and describe group flow in a higher education studio context to help us to better understand Sawyer's (2007) theory of group flow in

collaborative groups, and to identify possible implications for higher education and other creative, collaborative groups.

This dissertation was done in a multiple-article format, including three publishable articles. Because the articles were meant for immediate submission, each of the articles have been formatted for each prospective journal. References for sources cited outside of these articles are included at the end of the dissertation.

Article 1. Review of Group Flow Theory and Research: This literature review synthesizes studies on individual flow and how it is related to the theory of group flow, while integrating these group flow ideas with research on group work generally. We plan to submit this literature review to the journal *Thinking Skills and Creativity*.

Article 2. Describing Group Flow in the BYU Animation Studio: In this article, we identified examples of elements of group flow from recorded video data of the lab and presentation settings. In this article, I also provide additional insights into group flow that were not mentioned by Sawyer, as well as suggestions for further research. I plan to submit this article to the *Creativity Studies* journal.

Article 3. Teaching for Group Flow: This article expounds on the findings of Article 1 to address the ways group flow could be facilitated by professors and student leads. This article mainly focuses on the areas of task selection, group member selection, and a supportive environment. We plan to submit this article to a journal interested in the teaching of creativity and innovation in higher education, *Innovative Higher Education*.

ARTICLE 1: CONCEPTUALIZING GROUP FLOW:
A FRAMEWORK FOR FUTURE RESEARCH

Abstract

This literature review discusses the similarities in main themes between Csikszentmihályi's (1990) individual flow and Sawyer's (2007) theory of group flow, and compares Sawyer's theory with existing concepts in the literature on group work both in education and business. By synthesizing the ideas, we propose a simpler model for conceptualizing group flow consisting of the principles of vision, ownership and contribution, and effective communication. We propose that using this condensed version of Sawyer's leading principles might enable more research on this important topic.

Keywords: flow, group flow, education, team productivity, organizational behavior

Introduction

After researching the conditions of individual happiness, Csikszentmihályi (1990) identified certain conditions that were most likely to lead to individual flow, a state of work in which individuals are highly motivated. Many scholars have found that high levels of intrinsic motivation are closely correlated with creativity (Amabile, Conti, Coon, Lazenby & Herron, 1996; Csikszentmihályi, 1990; Hetland, Winner, Veenema, & Sheridan, 2007; Runco, 2007), suggesting a strong connection between individual flow and creativity.

In his book, *Group Genius*, Sawyer (2003) suggested that the conditions of individual flow and similar conditions could also be applied in collaborative groups, leading to a state of *group flow*. Sawyer's theory of group flow could have significant implications in group work generally, but especially in education and business, where the tasks assigned are becoming more complex and group-oriented, and often require problem solving and creativity (Hirst, Knippenberg, & Zhou, 2009). However, group flow has not been researched extensively in either of these areas. A review of this literature could help identify the ties between individual flow and group flow, and illuminate the value of group flow, especially in the proposed context of education. The purpose of this literature review is to use the conditions of Sawyer's theory of group flow to frame a discussion of pertinent research that explains possible implications for group flow in creative educational collaborations.

Review Methods

In this article, we use Sawyer's work on group flow as a framework for understanding the current literature on group work in collaborative creativity. The sources included in this literature review focus on Csikszentmihályi's works on individual flow; Sawyer's works on group flow; other sources that cite their works; and sources from search results in Google

Scholar, ERIC, PsychINFO, and Business Source Premier. Sources used in this literature review were predominantly from searches containing the phrases *group flow*, and *groups and creativity*. However, results from other searches have also been included, including searches using the following words and phrases: *group unity*, *collaboration*, *listening*, *creativity*, *innovation*, *group problem solving*, *group work*, and *teams*.

Individual Flow

The concept of individual flow has been researched extensively since the 1970s, and is still rigorously studied today, mostly as a theory of motivation. Csikszentmihályi (1990) developed the concept of “flow” to mean “the state in which people are so involved in an activity that nothing else seems to matter; the experience itself is so enjoyable that people will do it even at great cost, for the sheer sake of doing it” (Csikszentmihályi, p. 4). While this phenomenon was originally studied in leisure activities (Csikszentmihályi, 1975), studies have expanded to include a wide range of activities, including research in education (Egbert, 2004; Shernoff & Csikszentmihályi, 2003) and work-related activities (Fullagar & Kelloway, 2009; Ghani & Deshpande, 1994; Eisenberger, Jones, Stinglhamber, Shanock & Randall, 2005; Salanova, Bakker & Llorens, 2006).

While the research in flow may have begun as an interest in what makes people happy, it resulted in an interesting pattern in creativity as well. The results of the research suggested that not only were people happier and enjoyed the activity more when they were engaged in flow activities, and not only did they seek after opportunities for flow to happen (Csikszentmihályi, 1990), but when individuals experienced flow in what they were doing, it often resulted in a higher-quality, more creative output (Amabile et al., 1996; Csikszentmihályi, 2009; Hetland, Winner, Veenema, & Sheridan, 2013; Runco, 2004; Vollmeyer & Rheinberg, 2006). Besides

increased creativity, individual flow is said to have a number of positive effects, including motivation for learning (Vollmeyer & Rheinberg, 2006), production of meaningful artifacts and an increased sense of satisfaction, achievement, ownership, sense of self and identity (Baker & MacDonald, 2013), and improved mood (Fullagar & Kelloway, 2009).

After collecting a variety of data on flow experiences in many contexts, Csikszentmihályi (1990) found that some activities are more conducive to flow than others, in particular five specific conditions that make an activity more prone to flow achievement than other activities: clear task goals, intense concentration, a sense of control, a perceived balance of skills and challenge, and clear feedback. Also, depending on the task, certain conditions can be more important than others. For example, perceived control is more important in jobs with high variety, identity, autonomy, and feedback than in other types of tasks (Ghani & Deshpande, 1994). Perhaps this explains why, in a sample of 526 high school students across the United States, students were more engaged when participating in individual and group work than in listening to lectures, watching videos, or taking exams (Shernoff, Csikszentmihalyi, Schneider & Shernoff, 2003).

Clear Task Goals

In his research, Csikszentmihályi (1975) observed that flow often occurred in activities with clearly established rules for action—like rituals, games, or dances. “Flow usually has coherent, non-conflicting demands for action” (p. 46). As long as the rules are respected, a flow situation is a social system with no deviance (Csikszentmihályi & Bennett, 1971), which leads to less distraction (Csikszentmihályi, 1975). More recently, Nakamura and Csikszentmihályi (2009) clarified that having clear goals for an activity does not mean having an overall goal for an activity, but the main thing was knowing what to do moment to moment—having a clear view of the next step, and receiving immediate feedback on what you have just completed.

Intense Concentration

Possibly as a result of minimal distractions, subjects in flow in Csikszentmihályi's studies also often described a lack of self-consciousness, a perception that time passed more slowly. Csikszentmihályi (1990) frequently observed that this "intense concentration" regularly occurred for people in flow. It almost seemed that people sought for these opportunities for intense concentration because flow accompanied them.

Sense of Control

Csikszentmihályi noticed that flow experiences seemed to have an overall theme of a sense of control of actions and environment. It wasn't that people in flow were constantly trying to protect their control, but they were simply not worried by the possibility of the lack of control. Csikszentmihályi (1975) suggested that flow depends partially on environment and structure, but then it also depends on the individual's ability to restructure the environment—his or her surroundings—so flow can occur. In addition, in his interviews with diverse individuals experiencing individual flow, Csikszentmihályi observed that flow occurs when people can cope with all the demands for action—when the dangers are predictable and manageable. In Bakker's (2008) study of work-related flow among hundreds of employees in different occupations, in which flow was measured by a "short-term peak experience characterized by absorption, work enjoyment, and intrinsic work motivation" (p. 400), it was found that employees who were able to control how fast they work and which methods to use experienced greater individual flow. In addition, from a study regarding architectural students in studio work, Fullagar and Kelloway (2009) found that academic work that is high in autonomy is associated with flow.

Perceived Balance of Challenge and Skill

Descriptions of flow have also included a feeling that skills were adequate for meeting the demands of the creative task (Csikszentmihályi, 1975). Armstrong (2008) explained it as a perception of the balance of skills and challenge, and said flow can occur when individuals' skills are matched by the level of challenge involved during the activity so that they are motivated to continue pursuing the activity (Armstrong, 2008). In addition, many flow activities have opportunities for action—varying levels of difficulty and engagement. Csikszentmihályi (1975) gave the example of rock-climbing, where there are always increasing levels of challenges, new goals to achieve, so you always stay in flow, not beyond your level (anxiety), and not below your level (boredom).

Some researchers have suggested that the need for a perceived balance of challenge and skill may be dependent on other conditions. For example, in one study measuring flow for people using computers in the workplace, perceived control was more important for individuals with high task-scope jobs—jobs with high variety, identity, autonomy, and feedback—whereas challenge played a greater role for low task-scope individuals (Ghani & Deshpande, 1994). This suggested that different conditions of flow can be more important depending on the task, and also, that the perceived balance of challenge and skill might play a more significant role in jobs with low autonomy and feedback. In one study of employees' perceived skill and challenge at work across many different occupations, which again measured flow by absorption, work enjoyment, and intrinsic work motivation, it was found that high skill and challenge were associated with higher performance, increased task interest, and a positive mood and task interest, but only for achievement-oriented employees (Eisenberger et al., 2005), suggesting that individual motivations may influence the need for a balance of challenge and skill.

Clear Feedback

Another important element of Csikszentmihályi's individual flow is clear feedback. According to Csikszentmihályi (1975), flow usually has coherent, non-conflicting demands for action, and provides clear, unambiguous feedback. In flow, you don't stop to evaluate feedback; the process of action and reaction are so well practiced that they become automatic. This aspect of individual flow has often been coupled with autonomy, especially regarding the way in which feedback is offered. For example, in a study of undergraduate business students, it was found that individuals exhibited less creativity when they received negative feedback in a controlling style, rather than positive feedback in an informational style (Zhou, 1998). However, the feedback Csikszentmihályi referred to is not limited to verbal feedback between an instructor and a student, but it could also be applied to feedback between individuals, or even with the activity itself. This suggests that feedback can be given in contexts where there is not a clear answer, as in during creative processes, and could be even more influential in that type of process.

Summary of Conditions of Individual Flow

Clear task goals, intense concentration, a sense of control, a perceived balance of challenge and skill, and clear feedback accompany an experience of individual flow, leading to a higher level of individual performance. Some tasks are more conducive to flow than others, and the how these five specific conditions create flow could vary in different situations. Also, depending on the task, certain conditions can be more important than others. For example, perceived control is more important in jobs with high variety, identity, autonomy and feedback than in other types of tasks (Ghani & Deshpande, 1994).

Group Flow

There have been several studies of the conditions of individual flow, including in areas of education. Today, however, in the workplace, people more often work in groups than alone (Hirst, Knippenberg, & Zhou, 2009), and people generally acknowledge that groups can be more creative than individuals (Paulus, Larey, & Ortega, 1995). Many breakthrough innovations are a result of group creativity (Bennis & Biederman, 1997; Sawyer, 2007). However it is also known that putting people in groups alone does not lead to success (Paulus, Dzindolet, Poletes & Camacho, 1993). Sawyer (2000) proposed that the conditions that encourage individual flow might also encourage group flow, leading groups to produce more creative, higher-quality products.

Sawyer (2003) defined group flow as “a collective state that occurs when a group is performing at the peak of its abilities” (p. 167). While conditions for group flow are derived from the conditions of individual flow, group flow is different than individual flow because it is “a property of the group as a collective unit” (Sawyer, 2006, p. 158). To try to define the phenomenon of group flow, Sawyer (2007) revised Csikszentmihályi’s ideas to identify 10 conditions of group flow: goal, close listening, complete concentration, blending egos, equal participation, familiarity, communication, moving it forward, and the potential for failure. Because of the overlapping nature of these 10 conditions, we believe these can be grouped into three categories: vision, ownership and contribution, and communication. Grouping the conditions this way can facilitate greater communication and research by reducing the number of factors to consider when studying group flow. We now discuss each of these main categories, drawing on other literature to support Sawyer’s ideas.

Vision

In research concerning group creativity, there is often a concept of a vision, a goal, or a task at hand. As Csikszentmihályi (1996) discussed in individual flow, it is usually expected that the goal should be clear, with an understanding of what to do next. In Sawyer's (2007) discussion of a vision for group flow, he suggested that group flow occurs when there is a specific goal in mind and where there is potential for failure.

Specific goal in mind. Many researchers have concluded that having a group goal is one of the most important factors in determining group effectiveness (Guzzo & Shea, 1992; Pritchard, Jones, Roth, Stuebing, & Ekeberg, 1988; Weldon & Weingart, 1993), and have researched the importance of group commitment to those goals (Aubé, Brunelle, & Rousseau, 2014; Latham & Yukl, 1975; Locke, 1968; Maier, 1963; Vroom & Yetton, 1973). In addition, in a recent study of flow in team performance with 85 teams participating in a project management simulation, it was found that flow in groups is mediated by team goal commitment (Aubé et al., 2014). However, the research is inconclusive regarding when those goals should be introduced to a group and how those goals should be determined. One thought is that how those goals should function in a group depends at least in part on the type of goal being achieved.

In his explanation of having a specific goal in mind, Sawyer (2003) differentiated between unstructured and task-oriented groups. For example, with jazz improv or theater improv, the group doesn't have an explicit goal or task. However, Sawyer (2003) suggested, "Group flow is more likely when the extrinsic collective goal is matched by the number of pre-existing structures shared and used by the performers" (p. 167). An "extrinsic collective goal" can be generally implied by a deadline, or a specific question or problem to solve, such as "the task facing a business team when they know that by the end of the meeting they have to come up

with a resolution of a budget shortfall” (p. 167). On the other hand, a goal can be less explicit. “In improv, the only goals are intrinsic to the performance itself—to perform well and to entertain the audience” (Sawyer, 2003, p. 168). Sawyer suggests that different types of tasks require different types of goals. To be more specific, there are two main types of goals or tasks. First, a *problem-solving* creative task, which is when the goal is well-understood, and can be explicitly stated. This type of goal requires members to have worked together before, to share the same knowledge and assumptions, and to have a compelling vision and a shared mission in order to have flow (Sawyer, 2007). In contrast, a *problem-finding* creative task is where group members have to “find” and define the problem as they’re solving it. Most radical innovations occur when the goal isn’t known in advance. However, it was also found that groups may need a good team-appropriate challenge in order to experience social flow—challenges that require group members to act harmoniously together (Steiner, 1978), and thus when selecting a group’s goal or purpose, it is important to have one that challenges the group.

For group flow, Sawyer believed there should be a goal, but it should be a goal with flexibility and balance. Finding a balance can be difficult for creative groups. Sawyer summarized, “the key to improvised innovation is managing a paradox: establishing a goal that provides a focus for the team—just enough of one so that team members can tell when they move close to a solution—but one that’s open-ended enough for problem-finding creativity to emerge” (Sawyer, 2007, p. 45). For group flow, the goal must provide clear direction, without demanding the specifics of the outcome. The goal in group flow evolves and emerges through the process of feedback and individual adaptation.

While the type of task might influence the flow potential, another factor may just be working together versus working alone. Through a survey study, Walker (2010) observed that

recalled social flow experiences of a paddleball game were rated more enjoyable than solitary flow experiences. In an adjoining study, Walker found that not only did working in groups improve flow, but also, groups that worked together more interdependently reported more joy in flow than other, less interdependent groups. This suggests that while, to some extent, simply working in a group on a group-appropriate task can prepare individuals for flow, helping individuals to work together in specific ways can encourage more flow.

Potential for failure. In addition to having a specific goal in mind, Sawyer (2003) said there must be some potential for failure in order for group flow to occur. This may seem contradictory to Csikszentmihályi (1996), who said, “While in flow, we are too involved to be concerned with failure” (p. 112). However, Sawyer made a distinction that it’s not the failure itself that leads to flow, but the potential for failure and the authenticity of the task at hand. Sawyer illustrated this point by discussing performers in an actual performance versus in rehearsal. Sawyer suggested that using feelings of pressure and stage fright can act as a force to push group members towards flow experience. “There’s no creativity without failure, and there’s no group flow without risk of failure” (Sawyer, 2007, p. 55). Sawyer compared this to the concept of deliberate practice in the business world. In deliberate practice, as you’re doing a task, you’re constantly thinking about how to do it better, looking for lessons you can use the next time. As creative groups pursue deliberate practice, they can treat every task or activity as a rehearsal for the next time. A review of literature on problem-based learning suggests that students are more engaged when the problems involve risk and applicability (Albanese & Mitchell, 1993).

This is not to say group flow requires stress. Group flow happens when many tensions are in perfect balance: the tension between convention and novelty; between structure and

improvisation; between the critical, analytic mind and the freewheeling, outside-the-box mind; between listening to the rest of the group and speaking out in individual voices. Sawyer (2007) observed that group flow seems to fade in the presence of strict, high-pressure deadlines. In group flow, the group is focused on the natural progress emerging from members' work, not on meeting a deadline set by management. In a study of burnout in the workplace, it was found that work pressure generally had a positive relationship with absorption—losing a sense of time, and becoming immersed in work (Bakker, Schaufeli, Sixma, Bosveld, & Van Dierendonck, 2000). However, it was also found in the same study that emotional pressure had a negative relationship with work enjoyment. This supports the idea that certain kinds of pressure may enhance flow, but emotional pressure, such as clients who continuously complain despite an employee's efforts, can be distracting to the flow experience.

Ownership and Contribution

It is nice to have clear goals and an authentic task, but group flow cannot occur without team members being committed to those goals, being eager to do their part, with an understanding of how to do it. Thus, the other themes that emerge in the conditions for group flow are the concepts of group ownership and contribution. These themes arise from three of Sawyer's 10 conditions: a general sense of control, equal participation in the group, and familiarity with group members and the guiding principles of the task.

Being in control of actions and environment. Building from Csikszentmihályi's model for individual flow, Sawyer (2007) suggested that a general sense of control contributed to group flow. This should come as no surprise. Autonomy and achievement have gone hand-in-hand in studies in education (Jang, Reeve, & Deci, 2010; Roth, Assor, Kanat-Maymon, & Kaplan, 2007; van Loon, Ros, & Martens, 2012) and in the workplace (Amabile et al., 1996). Similar to

conclusions on individual creativity and flow, Sawyer (2007) declared that “group flow increases when people feel autonomy, competence, and relatedness. Many studies have found that team autonomy is the top predictor of team performance” (p. 49). But Sawyer’s definition of control also includes a paradox, because in group flow,

Participants must feel in control, yet at the same time they must remain flexible, listen closely, and always be willing to defer to the emergent flow of the group. The most innovative teams are the ones that can manage that paradox. (p. 49)

Although Sawyer did not discuss applicable research concerning how to encourage a sense of control, some researchers have used Self-Determination Theory to identify autonomy-supportive behaviors from an educational or management perspective. Autonomy-supportive behaviors include listening carefully, creating opportunities for others to work in their own ways, providing opportunities for conversation, creating an ideal environment with materials and seating arrangements that allow people to be physically engaged, recognizing improvement, and communicating an acknowledgement of others’ perspectives (Deci, Spiegel, Ryan, Koestner, & Kauffman, 1982; Flink, Boggiano, & Barrett, 1990; Reeve & Jang, 2006; Reeve, Bolt, & Cai, 1999). In contrast, the following behaviors have been shown to thwart autonomy: physically exhibiting worked-out solutions and answers before others have time to work on the problem independently, uttering directives and commands, and using controlling questions as a way of directing others’ work. (Deci et al., 1982; Flink et al., 1990; Reeve & Jang, 2006; Reeve et al., 1999). While effects of these methods have been observed on an individual basis, these leadership principles have yet to be researched on a group level.

Equal participation. Building off the idea of familiarity, Sawyer suggested that when group members have similar skill levels, with a basic understanding of the guiding principles of the task at hand that familiarity allows them to participate equally in the task.

Group flow is more likely to occur when all participants play an equal role in the collective creation of the final performance. Group flow is blocked if anyone's skill level is below that of the rest of the group's members; all must have comparable skill levels... It's also blocked when one person dominates, is arrogant, or doesn't think anything can be learned from the conversation. (Sawyer, 2007, p. 50)

When it comes to managing participation, Sawyer said managers have to participate at the same level as everyone else in order to achieve group flow. "Managers can participate in groups in flow, but they have to participate in the same way as everyone else by listening closely and granting autonomy and authority to the group's emergent decision process" (Sawyer, 2007, p. 51). By listening to and implementing the ideas from group members, managers can help ensure equal participation. Whereas, if managers dominate all decisions, some group members may choose not to contribute any feedback at all, leading to unequal participation and a loss of group flow.

Familiarity with group members. Sawyer (2003) noted that group flow is more likely to happen when group members are familiar with each other. Sawyer suggested that when group members are familiar with each other, they know the performance styles of "teammates" and "opponents" (p. 51). Working with group members towards a common goal can be compared to a community of practice. In communities of practice, groups of people gather together often to share ideas and develop unique perspectives on various topics. In so doing, they develop established ways of interacting, and a common sense of identity (Wenger, McDermott & Snyder, 2002). In addition, working with familiar people allows individuals to more easily identify subject-matter experts within the group. In his research on transactive memory, Wegner (1987) surveyed couples who were dating or married and found that as people come to know each other, they also become "storage devices" for information (p. 205). Instead of remembering details of a particular topic themselves, they would remember that their partner knew the information so they wouldn't have to remember themselves. In other words, people can have questions about how to

do a particular task, but instead of relying on their own memories to do the task, they can rely on the memory of the expert they know who knows how to do that task. Individual experts become responsible to remember or know something, which might possibly lead to a more efficient use of knowledge (Wegner, 1987). In terms of group flow, this would suggest that knowing and understanding the strengths of each of the individual team members could lead to more efficient use of individual knowledge within the group.

However, there is some controversy in the literature concerning familiarity versus diversity among group members. Sawyer (2007), acknowledging this debate, also referenced a study on group mind, which suggests that “groups may be smartest in their early stages” (Weick & Roberts, 1993, p. 356). Sawyer warned that familiarity can also cause creativity to wane after two or three years.

If everyone functions identically and shares the same habits of communicating, nothing new and unexpected will ever emerge because group members don't need to pay close attention to what the others are doing, and they don't continually have to update their understanding of what is going on. (Sawyer, 2007, p. 52)

Groupthink research also suggests that because group members are familiar with each other, they will sometimes seek “unanimity and consensus rather than careful analysis of options” (Miranda & Saunders, 1995, p. 194). In addition, prior experience can sometimes cause group members to fixate on the incorrect path (Duncker, 1926). Sawyer clarified that familiarity with group members might be more helpful for problem-solving activities, when the problem is already defined, because

If a group needs to find and define a new problem, too much shared information becomes a problem. Problem-finding groups are more likely to be in group flow when there's more diversity; problem-solving groups are more effective when more tacit knowledge is shared. (Sawyer, 2007, p. 52-53)

Familiarity with guiding principles. Another type of familiarity that Sawyer (2007) said was important to group flow was familiarity with guiding principles, a “common language

and a set of unspoken understandings, or tacit knowledge” (p. 51). Sawyer (2003) emphasized the importance of this tacit knowledge by suggesting that group flow is a function of goals and the number of “pre-existing structures shared and used” by group members (p. 167).

The pre-existing structures of a group are the basic rules and actions associated with a certain type of task, including: (a) An overall flow or outline of the task that all participants know in advance, (b) A shared repertoire of processes and a knowledge of how they sequence in order, and (c) A shared repertoire of conventions and terms (Sawyer, 2003; Sawyer, 2007). This principle echoes the results found in a study done by Chang, Huang, and Choi (2012), in which they analyzed 148 individuals completing two sets of creativity tasks with different levels of task autonomy. They observed that when individuals are given greater autonomy in a task, that autonomy more often increases creativity if the person has previous experience with that kind of task. This suggests that while individual autonomy may play an important role in group flow, it may depend on the individual’s familiarity with the task at hand.

Communication

As opposed to individual flow, where flow is achieved on an individual basis, group flow requires communication between group members. Particularly, the kind of improvisational communication that Sawyer (2007) suggested for group flow is not the kind that takes place in meetings, but in spontaneous conversations in the hallway or in social meetings after work or lunch. The constant communication in group flow is a combination of complete concentration, close listening, blending egos and moving the project forward.

Close listening. At the same time as experiencing a sense of control, in order for group flow to occur, individual members must become one with the group while practicing deep listening and building off of other group members’ ideas. Close listening occurs when members

of a group are fully engaged, and responding to what they hear from the rest of the group, as opposed to coming into an experience with preconceived ideas of how to reach the goal. Sawyer (2007) explained this in terms of a musical performance, noting that even while contributing to the “performance,” each “performer” remains open and listens to the others (p. 46). In groups, Sawyer called this open listening “deep listening,” where members of the group do not plan ahead what they’re going to say, but their statements are genuinely unplanned responses to what they hear (p. 46). Sawyer (2007) suggested that innovation is blocked when one or more of the participants already has a preconceived idea of how to reach the goal. He said improvisers frown on this practice, disapprovingly calling it “writing the script in your head” (p. 46-7).

Close listening may be encouraged in corporate and group settings, by taking precautions including setting aside other distractions, being mentally present at a meeting, and asking good questions (Sawyer, 2007). Sawyer said “people who listen are energizing, and people who energize others are proven to be higher performers” (p. 47).

Complete concentration. As in Csikszentmihályi’s model of individual flow, Sawyer suggested that groups in flow exhibit an intense, deep concentration, in which they are fully engaged in the activity and yet remain constantly aware of what their teammates and opponents are doing, as in playing basketball. Sawyer (2007) described this multi-tasking as dividing your senses, where you’re trying to decide your next move while being very aware of others. Some said they felt they couldn’t relax their attention or they would fall behind.

In a study observing video footage of groups of middle-school math students, Armstrong (2005) observed noticeable patterns of physical behaviors that accompanied concentration within the flow state. Armstrong noted that as group members got into this engaged state, group flow could be observed by observing certain behaviors between group members, including physical

and verbal cues, such as physical closeness, copying of gestures and phrases, and “a quick, fragmented way of speaking where members seemed to be finishing off each others’ sentences” (p. 103). Armstrong suggested that “the more that group members appear to be ‘of one mind,’ the more likely it is that group flow may be observed” (Armstrong, 2008, p. 103-104). Thus complete concentration in groups is not a solitary experience and can actually be observed.

Blending egos. With group flow comes a balance of contribution while listening, requiring each participant to blend with other participants, in a way that each person is “managing the paradoxes of improvisation by balancing deep listening with creative contribution” (Sawyer, 2007, p. 50). Sawyer discussed how group flow seems to be a continual conversation because of how every contribution builds on the previous contribution. “In group flow, each person’s idea builds on those just contributed by his or her colleagues. The improvisation appears to be guided by an invisible hand toward a peak, but small ideas build and an innovation emerges” (p. 50). Sawyer described the way the group works together as having an element of “magic” to it. “Group flow is the magical moment when it all comes together, when the group is in sync and the performers seem to be thinking with one mind” (p. 50). This group unity is a product, Sawyer suggests, of blending egos between group members, so that the group acts as a collective unit, rather than individual heroes or stars of success.

Many of the examples of this aspect of group flow are found in sports, when team members work together to find success rather than attributing the success to any one particular player. In a description of blending egos on the Seahawks football team, Kotler and Wheel (2015) described it as a sort of collective humility among team members. This is another unique attribute of group flow that does not have an obvious equivalent in individual flow, which merits some attention in other work-related contexts.

Collaborative emergence/moving it forward. Sawyer suggested that group flow does not end with a product or performance. “Group flow flourishes when people follow the first rule of improvisational acting: ‘yes, and . . .’ Listen closely to what’s being said; accept it fully; and then extend and build on it.” (Sawyer, 2007, p. 54). According to Sawyer, group flow means not just coming up with a solution, but trying it out, following-through with it, continuing to expand on the innovation after it is done.

Conclusions

Through understanding the nature of individual flow in work and education, we know that individual flow can be motivating, and can lead to improved performance, creativity, and enjoyment. Research has shown that creativity may be amplified in group settings. While many researchers are providing insights into various aspects of group flow, including studies on goal-setting, task selection, group autonomy, and brainstorming, these studies are often based on an input/output model, and often overlook descriptions of the group processes involved. At a time when so many are seeking to improve group productivity and creativity, more research on collaborative creative processes is needed. There is very little research that describes what group flow might look like in a collaborative, task-driven setting. We believe that one possible reason for this may be that Sawyer’s original 10 conditions appear overwhelming and have some overlapping concepts. In addition, the connection between group and individual flow may not always be clear, or the connection to other existing literature on group work that can inform studies of group flow moving forward. To address these issues, in this paper we have attempted to synthesize Sawyer’s 10 conditions into three main categories, and supported these ideas with other extant literature (see Table 1).

Table 1

Comparison of Conditions of Flow versus Group Flow by Theme

Theme	Flow (Csikszentmihályi, 1990, p. 49)	Group Flow (Sawyer, 2007, p. 44)
Vision	Clear goals	Specific goal in mind <i>Potential for failure</i>
Ownership & Contribution	Sense of control Concern for self disappears Task is comparable with skill level	Being in control of actions and environment <i>Equal Participation</i> <i>Familiarity (with Foundational Principles)</i> <i>Familiarity (with others in the group)</i>
Communication	Immediate feedback Concentration Sense of time is altered	<i>Communication</i> Complete Concentration <i>Close listening</i> <i>Blending Egos</i> <i>Moving it Forward</i>

Note. Italicized phrases indicate new ideas introduced with Sawyer's theory of Group Flow

As represented in this table, vision pertains to those elements that are directly related to the goal, purpose, and/or task of the group. The elements of ownership and contribution are elements that have to do with individual initiative, preparation, and sense of control or comfortability in the group. Within communication we have grouped together the elements that describe the quality or quantity of communication with the task itself or within the group. While some elements may be categorized differently by other researchers, these categories are meant to provide a preliminary frame of reference for a simpler discussion of group flow, in reflection of the principles of individual flow on which they were founded.

Some aspects of vision and ownership are heavily researched, especially quantitatively, but there is still much we can learn from the theory of group flow regarding the collaborative

nature of creativity, especially regarding more subjective themes of really listening to other group members' ideas, building from the ideas of group members, and supporting other group members—themes where research is sparse. Understanding what these elements look like in educational or business group settings will provide a fundamental stepping stone to being able to isolate the variables that allow us to facilitate and encourage group flow as teachers, managers, or even group members.

The literature on group work is varied and extensive. While many of the elements of flow are consistent with findings from literature, there has not been any research on these elements in the context of group flow as a recipe for group productivity and creativity, especially for higher education and business, where groups are becoming more critical for success. Additional research is needed to describe the application of the conditions of group flow, especially in teams. In addition, there is a need to better understand how teachers and group leaders can effectively enhance group flow within their groups for greater enjoyment, creativity and success.

References

- Albanese, M. A., & Mitchell, S. (1993). Problem-based learning: A review of literature on its outcomes and implementation issues. *Academic Medicine*, *68*(1), 52–81.
- Amabile, T. M. (1992). Social environments that kill creativity. In S. S. Gyskiewicz & D. A. Hills (Eds.), *Readings in Innovation*. Greensboro, NC: Center for Creative Leadership.
- Amabile, T. M., Conti, R., Coon, H., Lazenby, J., & Herron, M. (1996). Assessing the work environment for creativity. *Academy of Management Journal*, *39*(5), 1154–1184.
doi:10.2307/256995
- Armstrong, A. C. (2008). The fragility of group flow: The experiences of two small groups in a middle school mathematics classroom. *The Journal of Mathematical Behavior*, *27*(2), 101–115. doi:10.1016/j.jmathb.2008.08.001.
- Aubé, C., Brunelle, E., & Rousseau, V. (2014). Flow experience and team performance: The role of team goal commitment and information exchange. *Motivation & Emotion*, *38*(1), 120–130. doi:10.1007/s11031-013-9365-2.
- Baker, F. A., & MacDonald, R. A. R. (2013). Flow, identity, achievement, satisfaction and ownership during therapeutic songwriting experiences with university students and retirees. *Musicae Scientiae*, *17*(2), 131–146. doi:10.1177/1029864913476287
- Bakker, A. B., Schaufeli, W. B., Sixma, H. J., Bosveld, W., & Van Dierendonck, D. (2000). Patient demands, lack of reciprocity, and burnout: A five-year longitudinal study among general practitioners. *Journal of Organizational Behavior*, *21*(4), 425–441.
- Bennis, W. G., & Biederman, P. W. (1997). *Organizing genius*. Cambridge, MA: Perseus Books.

- Chang, J. W., Huang, D. W., & Choi, J. N. (2012). Is task autonomy beneficial for creativity? Prior task experience and self-control as boundary conditions. *Social Behavior & Personality, 40*(5), 705–724.
- Csikszentmihályi, M. (1975). *Beyond boredom and anxiety*. San Francisco, CA: Jossey-Bass.
- Csikszentmihályi, M. (1990). *Flow: The psychology of optimal experience*. New York, NY: Harper Perennial.
- Csikszentmihályi, M. (2000). *Beyond boredom and anxiety*. San Francisco, CA: Jossey-Bass.
- Deci, E. L., Spiegel, N. H., Ryan, R. M., Koestner, R., & Kauffman, M. (1982). Effects of performance standards on teaching styles: Behavior of controlling teachers. *Journal of Educational Psychology, 74*(6), 852-859.
- Duncker, K. (1926). A qualitative (experimental and theoretical) study of productive thinking (solving of comprehensible problems). *The Pedagogical Seminary and Journal of Genetic Psychology, 33*(4), 642–708.
- Egbert, J. (2004). A study of flow theory in the foreign language classroom. *Canadian Modern Language Review, 60*(5), 549–586.
- Eisenberger, R., Jones, J. R., Stinglhamber, F., Shanock, L., & Randall, A. T. (2005). Flow experiences at work: For high need achievers alone? *Journal of Organizational Behavior, 26*(7), 755–775. doi:10.1002/job.337
- Flink, C., Boggiano, A. K., & Barrett, M. (1990). Controlling teaching strategies: Undermining children's self-determination and performance. *Journal of Personality and Social Psychology, 59*(5), 916-924.

- Fullagar, C. J., & Kelloway, E. K. (2009). Flow at work: An experience sampling approach. *Journal of Occupational and Organizational Psychology, 82*(3), 595–615.
doi:10.1348/096317908X357903
- Ghani, J. A., & Deshpande, S. P. (1994). Task characteristics and the experience of optimal flow in human-computer interaction. *The Journal of Psychology, 128*(4), 381–391.
doi:10.1080/00223980.1994.9712742
- Hackman, J. R. (1987). The design of work teams. In J. W. Lorsch, *Handbook of organizational behavior* (pp. 315–342). Englewood Cliffs, NJ: Prentice-Hall.
- Hetland, L. (2013). *Studio thinking 2: The real benefits of visual arts education* (2nd ed.). New York, NY: Teachers College Press.
- Hirst, G., Knippenberg, D. V., & Zhou, J. (2009). A cross-level perspective on employee creativity: Goal orientation, team learning behavior, and individual creativity. *Academy of Management Journal, 52*(2), 280–293. doi:10.5465/AMJ.2009.37308035
- Jang, H., Reeve, J., & Deci, E. L. (2010). Engaging students in learning activities: It is not autonomy support or structure but autonomy support and structure. *Journal of Educational Psychology, 102*(3), 588–600. doi:10.1037/a0019682
- Karau, S. J., & Williams, K. D. (1993). Social loafing: A meta-analytic review and theoretical integration. *Journal of Personality and Social Psychology, 65*(4), 681–706.
doi:10.1037/0022-3514.65.4.681
- Kotler, S., & Wheal, J. (2015). The 4 secrets to seahawks NFC success and how they can be applied to business. *Forbes.com*. Retrieved January 26, 2015, from <http://www.forbes.com/sites/stevenkotler/2015/01/19/the-4-secrets-to-seahawks-nfc-success-and-how-they-can-be-applied-to-business/>

- Linder, J. C., Jarvenpaa, S. L., & Davenport, T. H. (2003). Toward an innovation sourcing strategy. *MIT Sloan Management Review*, 44(4), 43–49.
- Lockhart, R. S. and Lamon, M. and Gick, M. L. (1988). Conceptual transfer in simple insight problems. *Memory & Cognition*. 16(1).
- Mandigo, J. L., & Thompson, L. P. (1998). Go with the flow: How flow theory can help practitioners intrinsically motivate children to be physically active. *Physical Educator*, 55(3), 145–59.
- Miranda, S. M. & Saunders, C. (1995). Group support systems: An organization development intervention to combat groupthink. *Public Administration Quarterly*, 19(2), 193–216.
- Montuori, A., & Purser, R. E. (1999). Social creativity: Introduction. In A. Montuori & R. E. Purser (Eds.), *Social creativity* (Vol. 1, pp. 1–45). Cresskill, NJ: Hampton Press.
- Nakamura, J., & Csikszentmihályi, M. (2009). Flow theory and research. In C. R. Snyder & S. J. Lopez, *Oxford handbook of positive psychology* (pp. 195–206). Oxford, NY: Oxford University Press.
- Paulus, P. B., Dzindolet, M. T., Poletes, G., & Camacho, L. M. (1993). Perception of performance in group brainstorming: The illusion of group productivity. *Personality and Social Psychology Bulletin*, 19(1), 78–89.
- Paulus, P. B., & Nijstad, B. A. (2003). *Group creativity: Innovation through collaboration*. Oxford, NY: Oxford University Press. Retrieved from <http://psycnet.apa.org/psycinfo/2003-88061-000>
- Paulus, P. B., Larey, T. S., & Ortega, A. H. (1995). Performance and perceptions of brainstormers in an organizational setting. *Basic and Applied Social Psychology*, 17(1-2), 249–265. doi:10.1080/01973533.1995.9646143

- Pritchard, R. D., Jones, S. D., Roth, P. L., Stuebing, K. K., & Ekeberg, S. E. (1988). Effects of group feedback, goal setting, and incentives on organizational productivity. *Journal of Applied Psychology, 73*(2), 337-358.
- Reeve, J., Bolt, E., & Cai, Y. (1999). Autonomy-supportive teachers: How they teach and motivate students. *Journal of Educational Psychology, 91*(3), 537–548.
<http://doi.org/10.1037/0022-0663.91.3.537>
- Reeve, J., & Jang, H. (2006). What teachers say and do to support students' autonomy during a learning activity. *Journal of Educational Psychology, 98*(1), 209–218.
<http://doi.org/10.1037/0022-0663.98.1.209>
- Roth, G., Assor, A., Kanat-Maymon, Y., & Kaplan, H. (2007). Autonomous motivation for teaching: How self-determined teaching may lead to self-determined learning. *Journal of Educational Psychology, 99*(4), 761–774. <http://doi.org/10.1037/0022-0663.99.4.761>
- Runco, M. A. (2004). Creativity. *Annual Review of Psychology, 55*(1), 657–687.
[doi:10.1146/annurev.psych.55.090902.141502](https://doi.org/10.1146/annurev.psych.55.090902.141502)
- Salanova, M., Bakker, A. B., & Llorens, S. (2006). Flow at work: Evidence for an upward spiral of personal and organizational resources. *Journal of Happiness Studies, 7*(1), 1–22.
- Sawyer, K. (2003). *Group creativity: Music, theater, collaboration*. Mahwah, NJ: Lawrence Erlbaum Associates, Inc.
- Sawyer, K. (2007). *Group genius: The creative power of collaboration*. New York, NY: Basic Books.
- Steiner, E. (1978). *Group processes*. New York, NY: Academic Press.

- van Loon, A.-M., Ros, A., & Martens, R. (2012). Motivated learning with digital learning tasks: What about autonomy and structure? *Educational Technology Research and Development*, 60(6), 1015–1032.
- Vollmeyer, R., & Rheinberg, F. (2006). Motivational effects on self-regulated learning with different tasks. *Educational Psychology Review*, 18(3), 239–253. doi:10.1007/s10648-006-9017-0
- Walker, C. J. (2010). Experiencing flow: Is doing it together better than doing it alone? *The Journal of Positive Psychology*, 5(1), 3–11. doi:10.1080/17439760903271116
- Wegner, D. M. (1987). Transactive memory. In B. Mullen & G. R. Goethals (Eds.), *Theories of group behavior* (pp. 185–208). New York, NY: Springer-Verlag.
- Weick, K. E., & Roberts, K. H. (1993). Collective mind in organizations: Heedful interrelating on flight decks. *Administrative Science Quarterly*, 38(3), 357–381.
- Weisburg, R. W. and Alba, J. W. (1981). An examination of the alleged role of ‘fixation’ in the solution of several ‘insight’ problems. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 110(2). 169-192.
- Wenger, E., McDermott, R. A., & Snyder, W. (2002). *Cultivating communities of practice: A guide to managing knowledge*. Brighton, MA: Harvard Business Press

ARTICLE 2:

DESCRIBING GROUP FLOW IN A UNIVERSITY ANIMATION STUDIO

Abstract

This qualitative study reviewed the elements of group flow (Sawyer, 2007) present in a university animation studio over the course of one year of video footage from the senior film project. Footage included scenes from biweekly critique meetings, students working in the studio computer lab, as well as formal and informal interviews with faculty and students. Several elements of group flow were found in the video footage, including how helping group members learn *close listening*, by recognizing when to share ideas and when to “keep quiet” or otherwise support others’ ideas, improved overall productivity and creativity. In smaller group settings, everyday conversation opened the doors for collaborative problem-solving. Finally, having interdepartmental involvement, especially throughout a prolonged period of time, may lead to increased group flow, as well as higher quality, and more creative products.

Keywords: group flow, group projects, higher education, studio, inter-departmental collaboration, vision, ownership, group communication, close listening, vision

People increasingly are working in groups, rather than alone, to accomplish work tasks (Hirst et al. 2009; Wutchy et. al 2007), partly because of the complexity of products being created and problems being solved (Linder et al. 2003; Montuori, Purser 1999; Sawyer 2007). While these groups are more common in the business world, higher education has also been interested in encouraging group creativity (Haring-Smith 2006; Reigeluth, Garfinkle 1994). Increasingly, universities seek to simulate creative, collaborative groups where students work together to solve a problem or come up with a particular product (Haring-Smith 2006). These types of programs prepare students for jobs by teaching additional skills that can be realistically applied to future projects (Coakes, Smith 2007; Florida 2002), including soft skills that go beyond those an individual might demonstrate on traditional assessments. Theories of group creativity could provide a useful framework for encouraging a higher level of collaboration than has been heretofore achieved in higher education.

Sawyer (2006) used the term group flow to describe the phenomenon that occurs when a group is performing at its peak. Stemming from Csikszentmihályi's (1990) theory of individual flow, group flow is an emergent property of the entire group as a collective unit rather than a state of consciousness within the individual. In addition, Sawyer (2006) suggested that group flow may actually help individuals reach their own levels of individual flow.

While there have been some attempts to use group flow to describe group interactions, most of these attempts have been limited to contexts of music composition and performance (Baker, MacDonald 2013; Bryan-Kinns et al. 2007; Sawyer 2007) or in solving math problems (Armstrong 2008). More empirical research is needed to create a foundation of group flow as an academic framework in higher education, business, and group work generally. Understanding better what group flow looks like in these contexts is an essential first step in understanding how

to encourage group creativity and productivity through group flow. Thus, the purpose of this research is to identify and describe examples of the conditions of group flow in one particularly creative, collaborative setting in higher education.

Literature Review

In research on group creativity, there has been a tendency to research either one of two areas of extremes: individual creativity, apart from the group; or observing the group as a structure in itself, without acknowledging the individual components and contributions (Sawyer 2006a). From the outset, it would seem that the difference between individual and group flow follows the trend of this dichotomy, with some research on individual flow and others on group flow. However, the proposed conditions of group flow in actuality are derived from the original conditions of individual flow, with group flow adding another level of complexity to include the emergent properties of the entire group. In this way, Sawyer's theory spans both characteristics of the individual and the group itself. Thus group flow is not only "a property of the entire group as a collective unit" (Sawyer 2006a, p. 158), but it is also "an emergent property of the group" (p. 158) that can inspire individuals to do something they might not have done without the inspiration of the group.

Sawyer (2003) identified 10 conditions that define the phenomenon of group flow, which we have collapsed into the following themes: vision, ownership and contribution, and communication. While Sawyer's 10 conditions have not yet been studied in a problem-solving, higher education context, there are many insights that can be gained from research on individual flow and group creativity in general that can provide a foundation for understanding group flow.

Vision

In group work, there is usually a unifying vision—a task, need, or even a commonality—that initiates the gathering. Of Sawyer's (2007) 10 conditions, 2 in particular are most connected to the concept of vision: having a specific goal in mind, and having a potential for failure.

A specific goal in mind. The condition of having a specific goal in mind stems directly from Csikszentmihályi's condition for individual flow, that the activity have clear goals (Csikszentmihályi 1975; Csikszentmihályi 1990; Csikszentmihályi, M., Csikszentmihályi, I.S., 1988; Csikszentmihályi 1996; Nakamura, Csikszentmihályi 2009). The presence of group goals or objectives has been studied regularly in group effectiveness as the most important factor in determining group effectiveness (Guzzo, Shea 1992). In one study of 258 secondary school teachers, organizational resources, including social support and clear goals, facilitated work-related individual flow (Salanova et al. 2006). Regarding group goals specifically, Weldon and Weingart (1993) reviewed 34 studies, and found that having clear goals was an important factor in group performance, and specific, difficult goals generally produced better results than difficult but vague goals, such as "do your best." Additionally, when group members contribute to creating the goals, group members are more committed to the goals (Latham, Yuki 1975; Locke 1968). However, too much goal setting can cause group members to work towards goals even above their own better judgment and can lead to a confusion of values (Ordóñez et al. 2009). Ordóñez (2009) gave the example of Ford Motor Company's goal to produce a new car under 2,000 pounds and under \$2,000 under a strict deadline, and while what they produced met those deadlines, some safety checks were omitted to save time, leading to a car that could ignite when hit. Specific goals can be motivating and empowering, but how they are implemented can have significant implications.

Sawyer's (2007) idea of having a specific goal in mind has less to do with the sequence of tasks for a group agenda, and more to do with a collective understanding of the overall direction of the group. While many group settings in higher education have problem-solving creative goals, Sawyer suggested that the most creative groups tend to have a more flexible goal "that provides a focus for the team—just enough of one so that team members can tell when they move close to a solution—but one that's open-ended enough for problem-finding creativity to emerge" (Sawyer 2007, p. 45). This echoes the definition from Nakamura and Csikszentmihályi (2009): "Clear goals does not mean having an overall goal for the activity, but knowing what to do from one moment to the next" (p. 196).

Risk of failure. Another important aspect of group vision is choosing a level of risk, another element of group flow branching from individual flow theory. Csikszentmihályi (1975) discussed the flow state as involving a task that was more engaging than boring, but also not so intimidating that it produced anxiety. In his book, individuals who experienced flow and had no worry of failure because in flow, it was "clear what had to be done, and [their] skills were potentially adequate to the challenges" (p. 112). While group members should be somewhat familiar with the type of goal they are pursuing, research suggests that feelings of pressure and some stretching can push them towards a flow experience. In a study of flow in the workplace, it was found that work pressure generally had a positive relationship with absorption—losing a sense of time, and becoming immersed in work (Bakker et al. 2000). However, it was also found in the same study that emotional pressure had a negative relationship with work enjoyment. This supports the idea that certain kinds of pressure may enhance flow, but emotional pressure, such as clients who continuously complain despite an employee's efforts, can be distracting to the flow experience.

In Sawyer's (2007) conditions on group flow, he suggested that groups function better with some risk of failure. According to Sawyer, a group task should be one that is challenging enough that there is a risk of failure, because "there's no creativity without failure, and there's no group flow without risk of failure" (p. 55). While risk cannot be avoided completely in creative endeavors, ensuring that group members are clear on the goal and have the adequate skills for the challenge, the task selected can allow for enough risk to maintain engagement while increasing the likelihood of high-quality output.

Ownership and Contribution

Group ownership and contribution emerges from a general sense of control and equality in the group, and familiarity with group members and the guiding principles of the task. While each of these elements are conditions of the group, they each greatly depend on the work and effort of the individuals therein.

Being in control of actions and environment. Aligned with Csikszentmihályi's (1975) model for individual flow, Sawyer (2007) suggested that a general sense of control contributed to group flow. In the research literature, work autonomy and control over work environment are often discussed synonymously (Deci, Ryan 2002; Ghani, Deshpande 1994; Schernoff et al. 2003; Sternberg, Williams 1996), and they have often been studied in education (Jang et al. 2010) and the workplace (Amabile et al. 1996).

Researchers often associate concepts of work autonomy and work environment with management efforts to encourage individual creativity and flexibility within a task. And while those efforts are not excluded from group flow, Sawyer (2007) discussed the concepts of autonomy and control as conditions reached by the group member. Building off of conclusions on individual creativity and flow, Sawyer (2007) declared, "group flow increases when people

feel autonomy, competence, and relatedness. Many studies have found that team autonomy is the top predictor of team performance” (p. 49). But Sawyer’s definition of control also includes a paradox, because in group flow, “participants must feel in control, yet at the same time they must remain flexible, listen closely, and always be willing to defer to the emergent flow of the group. The most innovative teams are the ones that can manage that paradox” (p. 49).

Csikszentmihályi (1975) also discussed how individuals must know how to “restructure the environment so flow can occur” (p. 53). On this point he referenced examples of creative individuals “who generally take great pains to ensure that they can work in easy and uninterrupted concentration” (Csikszentmihályi 1996, p. 140), such as working in special places where they feel comfortable and in control. According to these ideas, the condition of a group’s sense of control over actions and environment can be greatly enhanced by the perceptions and actions of individual group members.

Equal participation. Several researchers have suggested that group work is better with equal participation, because when people participate in the decision-making, they will more often invest in the outcomes of those decisions (Kanter 1983; King et al. 1992). Also, in a study of collective intelligence, it was found that in the more successful teams, group members spoke for about the same amount of time (Woolley et al., 2010). However, equal participation is not a natural state for a group. In a survey of education, business, and mathematics majors, the number one obstacle of group work was free riding (Gottschall, García-Bayonas 2008). Social loafing describes the phenomenon that occurs when people spend less energy working in groups than in working individually (Karau, Williams 1993). In a review of studies on social loafing, it was found that social loafing can be found in almost any working group, and it occurs because of how individuals perceive their contributions will be valued (Karau, Williams 1993).

Sawyer (2007) argued that when group members have similar skill levels, with a basic understanding of the guiding principles of the task at hand, that familiarity allows them to participate equally in the task. “Group flow is more likely to occur when all participants play an equal role in the collective creation of the final performance. Group flow is blocked if anyone’s skill level is below that of the rest of the group’s members; all must have comparable skill levels. It’s also blocked when one person dominates, is arrogant, or doesn’t think anything can be learned from the conversation” (p. 50). This suggests that members will naturally participate equally when they have similar skill levels, and perceive their skill levels to be comparable with the rest of the group. For this reason, Sawyer (2007) said “managers can participate in groups in flow, but they have to participate in the same way as everyone else by listening closely and granting autonomy and authority to the group’s emergent decision process” (p. 51).

Familiarity with group members. In addition to a sense of control over actions and environment, Sawyer (2007) proposed that a sense of autonomy and control also derived from a sense of familiarity, both with other members of the group, and also with guiding principles of the task.

Creative groups often look for diversity and new situations to trigger new ideas. However, Sawyer (2007) noted that group flow is more likely to happen when group members are familiar with each other. Sawyer suggested that when group members are familiar with each other, they can better understand the working styles of those they work with. Groups that work together often can develop patterns for interacting and a common sense of identity (Wenger, McDermott, Snyder 2002). In addition, working with familiar people allows individuals to more easily identify subject-matter experts within the group. In his research on transactive memory, Wegner (1987) surveyed couples who were dating or married and found that as people come to

know each other, they also become “storage devices” (p. 187) for information. Instead of remembering details of a particular topic themselves, they would remember that their partner knew the information so they wouldn’t have to remember themselves. Individual experts become responsible to remember or know something, which might possibly lead to a more efficient use of knowledge (Wegner 1987). Being familiar with other group members could also teach members how to better read into how other group members are feeling, or social sensitivity, which is associated with collective group intelligence (Woolley et al. 2010). In terms of group flow, this would suggest that making the effort to get to know other group members, and understanding the strengths of each of the individual team members could lead to more efficient use of individual knowledge within the group.

However, many studies discuss the dangers of becoming too familiar as a group. Even Sawyer (2007) referenced a study on group mind, which suggests, “groups may be smartest in their early stages” (Weick, Roberts 1993, p. 356). Groupthink research concludes that because group members are familiar with each other, they will sometimes seek “unanimity and consensus rather than careful analysis of options” (Miranda, Saunders 1995). In addition, prior experience can sometimes cause group members to fixate on the incorrect path (Duncker 1926). Sawyer recommended that the level of diversity needed in a group may depend on the type of activity. For example, familiarity with group members might be more helpful for problem-solving activities, when the problem is already defined, because “If a group needs to find and define a new problem, too much shared information becomes a problem. Problem-finding groups are more likely to be in group flow when there’s more diversity; problem-solving groups are more effective when more tacit knowledge is shared” (p. 52-53). However, evidence of these claims is still under-researched, particularly in educational settings.

Familiarity with guiding principles. Sawyer (2003) talked about how group members should have individual familiarity with foundational knowledge needed to complete the goal, including the overall flow or routine of completing the task, and having a shared repertoire of “pre-existing structures” (p. 168). This means that each individual in the group has to have at least a basic understanding of the typical processes associated with a particular type of task, an understanding of general project roles, and have the basic skills and knowledge necessary to complete their parts of a particular task.

Research on previous experience supports the idea that individual performance within a group is enhanced with prior task experience. In a study done by Chang, Huang, and Choi (2012), they analyzed 148 individuals completing two sets of creativity tasks with different levels of task autonomy. They observed that when individuals are given greater autonomy in a task, that autonomy more often increases creativity if the person has previous experience with that kind of task. In addition, research on group efficacy generally promotes the idea that if group members generally do not believe the group can accomplish the task, they will have less motivation to complete the task (Salanova et al. 2006). This may mean that for group flow, if group members do not believe their skills or understanding of foundational principles is adequate for the task at hand, they will not be able to experience as much group flow.

Familiarity with group members can also mean a shared “common language and a set of unspoken understandings, or tacit knowledge” (Sawyer 2007, p. 51). Sawyer (2003) emphasized the importance of this tacit knowledge by suggesting that group flow is a function of goals and the number of “pre-existing structures shared and used” by group members (p. 167), including:

- (a) An overall flow or outline of the task that all participants know in advance,
- (b) A shared repertoire of processes and a knowledge of how they sequence in order,
- (c) Clearly-defined roles

for each group member, and (d) A shared repertoire of conventions and terms (Sawyer 2003, p. 168, Sawyer 2007, p. 52).

Communication

The final set of conditions for group flow set forth by Sawyer (2007) has to do with the interpersonal conversations, verbal and non-verbal, between group members. Sawyer discussed how group flow was like a continual conversation because of how every contribution builds on the previous contribution. “Sawyer described the way the group works together as having an element of “magic” to it. “Group flow is the magical moment when it all comes together, when the group is in sync and the performers seem to be thinking with one mind” (p. 50).

The kind of improvisational communication that Sawyer (2007) suggested is not the kind that takes place in meetings, but the kind of communication that leads to group flow is more likely to happen in spontaneous conversations in the hallway or in social meetings after work or lunch. The constant communication of group flow is a balance between the interrelated elements of complete concentration, close listening, blending egos, and moving the project forward.

Complete concentration. When Csikszentmihályi talked about concentration in individual flow (Csikszentmihályi, M., Csikszentmihályi, I. S. 1988), he talked about a merging of actions and awareness, where individuals became very engaged with the moment, experiencing a loss of self-consciousness. As in Csikszentmihályi’s model of individual flow, Sawyer (2007) suggested that groups in flow exhibit an intense, deep concentration, in which individuals are fully engaged in the activity and yet remain constantly aware of what their teammates and opponents are doing, as in playing basketball.

In a study observing video footage of groups of middle-school math students, Armstrong (2005) observed noticeable patterns of physical behaviors that accompanied concentration within

the flow state, including physical closeness, copying of gestures and phrases, and “a quick, fragmented way of speaking where members seemed to be finishing off each others’ sentences.” Armstrong suggested that “the more that group members appear to be ‘of one mind,’ the more likely it is that group flow may be observed” (Armstrong 2008, p. 103-104).

Close listening. Unique to the theory of group flow is the concept of close listening, which is an openness that comes when members of a group are fully engaged, but also open to what ideas or feedback they hear from the rest of the group, as opposed to coming into an experience with preconceived ideas of how to reach the goal. Sawyer explained this in terms of a musical performance, noting that even while contributing to the “performance,” each “performer” remains open and listens to the others (Sawyer 2007, p. 46). In group flow, each person’s idea builds on those just contributed by his or her colleagues. The improvisation appears to be guided by an invisible hand toward a peak, but small ideas build and an innovation emerges” (p. 50). This aspect of group flow is improvisational in nature, in that members of the group don’t plan ahead what they’re going to say, but their statements are genuinely unplanned responses to what they hear. Sawyer (2007) suggested that innovation is blocked when one or more of the participants already has a preconceived idea of how to reach the goal. He said improvisers frown on this practice, negatively calling it “writing the script in your head” (p. 46-7).

Sawyer suggested that close listening may be encouraged in corporate and group settings, by taking precautions including setting aside other distractions, being mentally present at a meeting, and asking good questions. Sawyer (2007) said “people who listen are energizing, and people who energize others are proven to be higher performers” (p. 47).

Blending egos. In jazz musical groups, performers must be individually very talented musicians, but at the same time, they must know how to blend in with the other members of the group. Similarly, with group flow comes a balance of contribution while listening, requiring each participant to blend with other participants, in a way that each person is “managing the paradoxes of improvisation by balancing deep listening with creative contribution” (Sawyer 2007, p. 50). A study on management teams observed, “constructive controversy occurs when decision makers believe they are in a cooperative group context in which mutually beneficial goals are emphasized rather than in a competitive context in which they feel their personal competence is questioned” (West, Anderson 1996, p. 684). When individual group members feel that their ideas are valued the same as other ideas, they can have constructive, versus destructive, controversy.

Collaborative emergence/moving it forward. Group flow continues as group members continually build on the suggestions and ideas of others in the group. Sawyer (2007) suggested that group flow does not end with a product or performance. “Group flow flourishes when people follow the first rule of improvisational acting: “yes, and . . .” Listen closely to what’s being said; accept it fully; and then extend and build on it.” (p. 54). According to Sawyer, group flow means not just coming up with a solution, but trying it out, following-through with it, continuing to expand on the innovation after it’s done, applauding acceptance and spontaneity.

Many researchers, including Sawyer, have highlighted the importance of group improvisation, comparing it with the unplanned composition of jazz musicians (Weick 1998). Vera and Crossan (2005) described improvisational theater principles: practice, collaboration, “agree, accept, and add,” “be present in the moment,” and “draw on reincorporation and ready-mades” (p. 203). Teaching improvisational exercises to groups has been shown to improve

group improvisational skills (Vera, Crossan 2005) as well as overall work group climate (Kirsten, DuPreez 2010).

Summary

In summary, Table 2, from a literature review on group flow (Author, unpublished), presents some of the significant similarities and differences between the conditions for individual flow versus the conditions for group flow, identifying possible ways that we can gain additional insights from group flow that surpass existing research on individual flow.

Table 2

Comparison of Conditions of Flow versus Group Flow by Theme

Theme	Flow (Csikszentmihályi, 1990, p. 49)	Group Flow (Sawyer, 2007, p. 44)
Vision	Clear goals	Specific goal in mind <i>Potential for failure</i>
Ownership & Contribution	Sense of control Concern for self disappears Task is comparable with skill level	Being in control of actions and environment <i>Equal Participation</i> <i>Familiarity (with Foundational Principles)</i> <i>Familiarity (with others in the group)</i>
Communication	Immediate feedback Concentration Sense of time is altered	<i>Communication</i> Complete Concentration <i>Close listening</i> <i>Blending Egos</i> <i>Moving it Forward</i>

Note. Italicized phrases indicate new ideas introduced in Sawyer's theory of group flow

As higher education seeks a way to effectively prepare students for solving increasingly complex problems with greater creativity, it requires an improved framework for understanding those processes that make creative collaboration most effective and efficient. Sawyer's theory of group flow gives us an initial framework for gaining additional insights into the group dynamics

of problem-solving activities, building off of the foundational principles of individual flow.

However, research is needed to verify and describe these principles for higher education groups.

Research Question

How do students in a higher education animation studio experience vision, ownership/contribution, and communication through their group design experience?

Context

This study was conducted at a major university in the intermountain west in an animation studio where students have the opportunity to work together to create a senior animated film. For this study, we use “studio” to designate a project-based environment associated with physical space and/or specialized resources, which a group of students can use in working together to create a specific product. Though the studio has gone through several changes since its creation, the resulting films from the animation studio have repeatedly received national recognition for quality and creativity, winning 17 student Emmys in 12 years, while also receiving recognition for their uniquely collaborative approach to projects (Kenner 2015). Because of their tremendous success as a collective group in producing award-winning films, it is likely that they are also experiencing a greater amount of group flow than other programs.

Students involved in the animation studio were mostly university juniors and seniors who were given the option to participate in the animation studio as opposed to creating their own senior projects. When this process was beginning to be documented, most students had come to know each other from other classes, and had taken a few skills courses (e.g., Business and Ethics in Animation, Basic Storyboarding) to give them a more advanced understanding of animation and production.

Research Design

Merriam (1998) differentiated between three types of studies common in education: positivist, interpretive, and critical. This study was an interpretive study, which sought to understand the meaning of an educational process or lived experience using qualitative inquiry. To try to understand and describe the experience of group flow in this educational setting, this study employed a mix of qualitative methods. Strauss and Corbin (1990) suggested analyzing the data by identifying important concepts that are prevalent or that may seem to define the experience, following by writing memos—insights from the researcher. In this case, these methods were used to identify and describe the experience of the elements of group flow to bring greater awareness to how they may exist in context.

Sampling and Analysis

Over 60 hours of video footage for this project were recorded throughout the 2010-2011 academic school year of the university animation studio by the second author of this study as part of prior research. This video footage was taken in two main settings: in the computer lab studio where students do most of their animating work, and in the theater room in which the team held their *Daily meetings* (so named because they are held daily in industry), which were held bi-weekly to view, discuss, and provide feedback on the progress of individual work and the end product as a whole. In addition, individual interviews were conducted with students and professors to provide additional insight.

To identify examples in the video data for analysis, the entire useable video footage was organized into events, every event identifying a significant conversation or activity. However, because the video footage was recorded from the back of the room in order to not disturb the meeting, some student or faculty statements were either too soft or too jumbled to understand.

These excerpts were not analyzed. In addition, students were not always visible during all video segments, so sometimes it was unclear which group member was speaking.

The remaining video data went through several overlapping phases of analysis. In the first phase, the entire 60 hours of video footage was watched, coded, and described in a spreadsheet. The events were originally coded using methods of thematic analysis (Braun & Clarke, 2006) and memos (Author, 2012) in an attempt to name and develop emerging concepts, while reflecting on the experience, without trying to fit happenings into an existing theory. Similar themes that emerged were aggregated into categories and sub-categories based on common patterns found in the data. For example, as one theme appeared regularly, such as “Don’t be a Cancer,” we listed that theme either as a sub-theme to an existing category, as in this case when we put it under “Ownership,” or created a new theme.

Following this initial coding for emerging themes, the themes were aggregated using typological methods (Hatch 2002) to compare the main themes of the data with the main themes from the literature. For each video event, we included a brief summary of the event, and then for significant and potentially insightful events, memos and main themes were also listed. Due to the amount of video data, video events were not transcribed until selected for discussion (Authors, 2011). Selected events were transcribed, and the most insightful quotes from those events were included in this paper. During this phase of analysis, we also regularly reflected on the video footage through journaling.

Trustworthiness

To establish trustworthiness in my study, we triangulated findings from the “daily” meetings, interviews, and recordings of student activity in the studio, and engaged in prolonged engagement by observing over 60 hours of video data. In addition, we used research journaling

as an audit trail for consistency in findings. We also applied negative case analysis, which adjusted our original goal of identifying single events encapsulating group flow so that instead we considered various elements of group flow spread throughout the student experience.

Member checking was not possible because the participants were no longer at the university and available. We also sought to provide rich descriptions of the study and its context, to allow readers to decide whether this study could be transferable to other contexts or settings.

Findings

In this section, we describe the beginning phases of the project to help readers better understand the context of the findings. We then discuss the main cross-cutting themes that emerged from the data. We have divided the findings into three main categories: Vision, Ownership and Contribution, and Communication. In each of these sections, we provide examples of how these themes of group flow existed in this group.

This cohort of animation students was a group of juniors when the project began in January of 2010. At that point, students finishing a class in storyboarding proposed ideas for the main story of the student film. After an initial vetting, the faculty chose seven stories to “pitch” to their classmates, who voted to choose the story for the senior film, as well as the student director, and the student producer. Students actually working on the film were in a state of constant flux, as some of them were students in the program hoping to gain experience, some were working on the film to fulfill a senior project requirement, one was a freshman hoping for admittance into the program, and some were volunteers from other departments seeking to build resumes. Students were also coming onto the project and leaving to fulfill internships. However, there was a main core of 20-30 students who were consistently involved on the film, and the data predominantly shows their experiences. Students worked on the film through the summer if they

didn't have internships, and through the following school year, in order to submit the film in April to film festivals.

Vision: Fitting In with “Our Style”

In video segments coded for vision, students discussed and pursued the goal of completing a senior film, and the goal of a positive group experience. These project- and people-oriented goals complemented each other and allowed for many of the elements of group flow.

Project-oriented vision. The students created the main aspects of the senior film, including the story, the desired look for the film, and the personalities and attributes of the characters. Brian (pseudonyms were used in this article), the student director of the film, and Chris, the student producer, discussed the ideas early in the program and were the originators of many of the main ideas. The overall vision for the project—the story, the settings, the Irish theme—stayed close to their original course. But the rest of the team brought the original vision to life. The original vision for the film guided the process throughout the project. It also drove the tasks. Group members interpreted the original ideas to create each of the characters, scenes, and assets (individual objects included in the film, such as a stool or chandelier), lighting, and rigging (programming movement points for an asset or character to allow it to move).

Innumerable times group members added their own vision to the existing vision to give life to the original idea, with unique personal touches and details.

One student, for example, was assigned to create a chandelier. He showed his version of the asset to the group, who responded saying it needed to be altered to better fit the project vision:

Chris: Here is Tony's chandelier. I told him, to you and Blake, and Justin. Because It looks really nice, but...

Jason: We'll just use an example, it's not very pushed. I mean, it looks perfect. And...

Brian: And that's the problem.

Jason: It doesn't fit with our style. Very much. Um, it looks great. Don't get me wrong, Tony. But it's just not pushed. It's not the style that we need, that we're going for, it doesn't have the, oh what was it, off-set realism, or the imbalanced rectangularity (chuckles)... So yeah.

Justin: It'll be easy though to take that now though, Tony, put some lattices on some of those things, and just move stuff around.

Jason: Yeah, I think it will work.

Tony: Right.

Justin: Like you look at Amber's chain she did, that's a good example of just like...

Brian: Like...yeah. Because these chains are too...regular. I'd actually really like you to look at the chain that Amber did, and make sure yours look more like that.

Tony: uh-huh.

Brian: And then again, these are too perfectly spherical, you know. He just needs to warp them a little bit.

Here the students talked about their own observations, and why the chandelier does not fit the project vision. They also refer to another piece that another student created for the film and used it as an example to follow. The original plan did not have a design for the chain that was perfect for the project, but it was created by the students involved and identified by the group as the style the *whole* group wanted to pursue.

Sawyer (2007) wrote that a vision can change throughout the project. Having a specific vision for the story and settings and Irish theme provided the opportunities for individual adaptation and group input. It may have been the vision for the film that allowed students to understand the project faster, to be able to apply creativity in more specific contexts where it could be helpful.

The story the students chose was a challenge, with a real risk involved. When the students voted for which story to work on as the senior film, they were aware of many of the

risks associated with this story. In an interview with Dave, the Program Director, he talked about the ambitious project when it was proposed:

Pixar budgets to start, \$2M. These are professionals with experience, they have \$2M, 2 characters, 1 environment. So we pitched and chose [this film], which is supposed to be outside of a, out on the street, in this big city, but also, inside of this Irish pub kind of thing, kind of a fight club, so now we've got 2 environments. And we've got 2 boxers, we have a ringmaster, and we have an audience watching this thing. . . . I just cannot find a way to simplify it. And the room needs to be full of dust and smoke and haze and just all . . . every hard thing you can think of they wanted to put in this thing. So that was, that was just . . . a big project.

Students and professors knew that by choosing this story they were choosing a challenge, for the group and for all the group members. A vision this difficult made a “risk of failure” possible, something that Sawyer (2007, p. 55) suggested can push group members to a state of flow.

People-oriented vision. Besides completing the project, another main goal of this project was to help group members get jobs, especially through impressive portfolios or “demo reels” that required learning to work together as a group. Though it was not the main goal, the vision of having a positive group experience was a real part of the vision that guided the interactions of group members. The focus on the group may have been because Dave, the program director, mentioned throughout the program that when professional studios called looking for recommendations, they looked for students who could work well in groups. For a variety of reasons, students made a concerted effort to work well together. Jason, the student lead over lighting, felt it made a big enough difference to push for group activities: “In the past, it's shown that if we get together as a group, it provides unity and strength, and better friendship (laughs). No, but it like, it will help really get things done ‘cause we'll communicate better.” Saying this early on in the semester, Jason helped start a tradition of social events for the group that helped them get to know each other on a personal level.

One of the professors noted in an interview that this group was particularly cohesive, and how that can influence the productivity of the group:

Compared to previous groups, there have been less personality conflicts with this group than with any other group in the past. They get along really well. . . . At times in the past, there have been personality problems, some people don't like certain direction that they're given, and it causes a little bit of conflict, and so students will drop off the project, slow things down. It massively impacts the productivity of the project when they're not getting along.

In this group, and especially as the year progressed, students often playfully teased each other, greeted each other as they entered meetings, and talked about their personal lives. They were supportive of each other and tried to help each other when they had problems with their project tasks, and it did seem to help the project go smoother.

While the project-oriented goal gave the group the specific vision of what they should be doing and working on, the people-oriented vision gave them the "higher order goal" (West 1990, p. 310) to learn how, and to experience how, enhancing the people-oriented aspects could improve the overall project. The combination of these two complementary goals provided the foundation for the other conditions of group flow.

Ownership and Contribution: "Don't Be a Cancer"

Several students demonstrated personal interest in the group goals and took control of their actions and environments while working on this film. Part of that may have come from the expectation that it was up to them, not a professor, or another group member, to succeed, and that failure could happen.

One student, a senior from another program, while creating the towels that would be shown on a shelf in the gym scene talked about how it seemed like the task should have been easy, but instead was complex. When the interviewer asked if he was going to talk with a teacher to get some advice, he laughed as he realized that was probably a good idea. But then he said,

“The thing is, um, there’s a lot of value in figuring it out for yourself, because then you own it. What you’re really producing when you do this kind of work isn’t necessarily a finished image, but . . . how you get there. If somebody else figured it out for you, then they kinda own it.” For this student, putting in the effort to figure out how to do something difficult on his own was worth the extra time, because of the added sense of ownership for the process as well as the end product.

Faculty members played a key role in providing and defending the autonomy of the group and the individuals. Students were allowed to work on the tasks they were interested in, and encouraged to pick a team based on their personal goals. At one point, the student director went to the whiteboard to write a list of tasks and invited students to volunteer to complete them. One time, the professor stood pacing in front of the room, speaking informally:

Dave: So here’s my suggestion. . . . Phoebe said she wants to go into layout. And I’m not saying that she gets to be the layout lead. But as an example, you probably want to make her layout lead. (He smiles, everyone laughs). Because she’s passionate about it, she knows that her portfolio depends on it. . . .

Brian: That’s something that we’ve been trying to do, is making sure people get to work on what they want to work on, that way they stay on the project. Because they’re doing something that they want to do.

Student leads and professors alike consciously tried to allow students to volunteer for the tasks they had interest in, because they felt students would be more motivated to work on those tasks if they got to pursue their personal interests. This could be an example of valuing student ownership of a task, encouraging students to use their personal interests to contribute to improve the end project.

However, during several interviews, students and faculty members also talked about sometimes having to encourage student ownership of ideas that were not originally their own.

Jason, one of the student leads, told about how he had submitted a story for the senior film, and it wasn't selected:

I submitted a story too, just like our director did, and we were tied in votes (laughs), and it was between my pitch of the film and his pitch of the film. And then, we did a re-vote, and we tied again, and then we did a re-vote and then one person voted his over mine. But um, to tell you the truth, it didn't really affect me, because I was, I wasn't putting a lot on the line, I actually didn't expect my story to go that far (laughs), I was just doing it for fun. So, it didn't really bug me or anything. But um, I think already knowing how rejection feels or criticism, stuff like that, I wasn't, it didn't, like, being trained in that way from my earlier classes wasn't really that big of a deal to me. And I think a lot of the people here who work on this film are pretty mature about that aspect of it. They take it (pauses) humbly, and they're just like, okay, well let me go figure out what I can do to improve my shot, or what I'm working on.

In this example, the student's idea was not chosen, but instead of feeling thwarted and resenting the group decision, he pursued the group's idea and looked for an area where he could make a difference. He recognized that his reaction to that event may have been in part to how he was taught to respond to criticism, how to avoid being a "cancer" to the group. Professors in the program often warned students against becoming "cancers"—people who are so convinced that their idea is the best that they only criticize the group and group members until it brings everyone down. Many of the students were aware of the potential to be a "cancer" to the group, and recognized that it was something that needed to be avoided in order for the group to be successful.

In addition to contributing to the project through designing assets or parts of the film, this animation studio promoted a very unique model for peer mentoring, where students also took ownership for mentoring each other. In the studio computer lab where many students worked, students would often lean over and ask a fellow student for feedback or guidance, and students would take the time to provide the help and feedback others needed. This liberal mentoring created a significant sharing of foundational knowledge that allowed the students to complete their tasks on the film. The faculty director of the program mentioned that this was very different

from typical higher education models, where students may feel that by sharing what they know, they put their own grade in jeopardy:

I'm always telling my students, there's two ways to cheat in my classroom. Taking credit for something you didn't do is always cheating. But in life, also you're cheating yourself and other people if you know or can do something and you're not helping somebody else. That's cheating. Which is opposite if you think of a regular school class. You're cheating if you help somebody, and in my class you're cheating if you're not helping somebody.

Students were strongly encouraged to help other students with their tasks, creating a unique resource of classmates willing to help each other. Changing the paradigm of information within the group from competitive to supportive created a stronger common familiarity with group members and foundational principles (Sawyer 2007), illustrating those elements of group flow.

Communication: “It’s Not My Film, It’s Our Film”

Students were constantly communicating with others to design and produce a complete scene, and individual tasks often had aspects that were dependent on other members of the group. During *Daily meetings*, students voiced their ideas and feedback for the project while listening to the ideas of others. Early on in the project, for example, the students looked at snapshots taken from existing videos to find examples of the types of elements they wanted to include in the senior film.

Jason: Brian, are we going [to] this detail on the skin?

Brian: Uh, actually, I think that might be little bit too much.

Jason: Okay.

Megan: What?

Jessica: Really? I like it!

Brian: But I think this has some nice stuff that we can incorporate into it, like the freckling.

Jason: The only detail on it is the freckles. (another student: Yeah.)

Student: But when you can see pores and stuff in there, this is a little more than *Alma*, I feel.

Brian: Yeah.

Devin: Like *Monsters*.

Brian: But a good blend between *Alma* and this. And these are things that we can throw, you know like . . .

Justin: I think the other characters are good examples.

Brian: Since Paddy is a redhead . . .

(chatter, laughing, go on to next slide)

Justin: See *his* skin is . . .

Megan: Nice. Big.

Jason: Yes.

Devin: Flat.

Brian: And again, look at, like, this is a good example of like the difference between like, fog, and then higher atmospherics, and then more direct lighting.

Student: With the framing with the light.

Brian: um-hm. And the leaves here serve as a good analog for like the trash and dirtiness, and stuff that we want on the screen.

Justin: As far as design goes, I was looking at this *Ratatouille* still. And even this is probably, like the bricks are a little bit off-set, but we probably want to go even a little bit more.

Brian: Uh-huh.

Justin: Like those big bricks on the right, we would want to make those, you know, the top of each shapes that we had talked about, instead of...

Megan: Right.

Justin: So it's not, even the . . . The environments in *Ratatouille* are pretty realistic.

Devin: Oh yeah.

Justin: As far as variance goes.

Devin: We would do more . . .

Travis: More off-set.

In this segment, although the student director was leading the discussion, other students jumped in with their own comments and suggestions, asking questions to try to understand the vision for the film while adding their own ideas as well. As in Sawyer's (2007) idea of "deep listening," these students are providing "genuinely unplanned responses to what they hear" (p. 46-47), while remaining open and listening to others. Throughout the footage, there were varying contexts for discussion and communication, and some contexts had specific feedback purposes. For example, the *Daily meetings* for this group were not supposed to be the main source of communication but a place where class members received general feedback, and presented what they had accomplished that week. Many times while presenting preliminary ideas for an asset or character, students would freely speak ideas that would come to them ("I think he should have a tattoo!"). In other meetings, students with strong opinions defended their ideas to get approval from the group, or from faculty members.

One example of open communication was that the original ending to the story was not settled on for several months, but instead discussed several times in *Daily meetings*. During one interview with the Brian, he talked about how the group had changed the ending to improve his original idea:

Brian: Originally what was going to happen also was the homeless guy was there and Clarence was gonna give everything that he won to the homeless guy. . . . It was just sorta like, well that sucks, he just worked really hard and he doesn't get to keep any of his stuff? . . . We had that as a completed animatic, and we showed that to Pete (Cory nods), and Pete, one of our faculty advisors, was like, well, what if instead of giving him the meat he just gives him the flyer? And that was like . . . Lightbulb! . . . We all had to learn to do it in the story group, just learn to swallow our ego at certain times and just realize, okay, this isn't just my project, it is the group project. Like, I really took a much more pessimistic view of the world, and so I really wanted the film to be, to have like a dark ending, where like Clarence is just like beat up and then it's like at the end, Well, you're

beaten up, now let's spit on you a little bit. But yeah, I just, I couldn't, it's not my film. It's our film.

In this excerpt, Brian talked about the many students and teachers involved in evolving the ending of the film. The video footage of the *Daily meetings* paralleled Brian's account. In one meeting, Brian announced a new idea for the ending, where Clarence gives all his meat away to a homeless man on the street. Another one of the student leads spoke up and said that ending wasn't "gratifying" enough; that it needed more. As other students rambled off ideas, the same student lead spoke up and suggested that maybe Clarence could give the homeless person a flyer for the boxing match, bringing the film full-circle. Though a decision was not reached during that meeting, the idea mentioned was eventually chosen as the ending for the film. While this example told a story of Brian's experience of not being a "cancer" to the group by accepting the group's idea over his own, it also illustrated the spontaneous, improvisational nature of creating a film as a group with many voices and opinions. Students and professors shared ideas openly while listening to the ideas of others, until eventually some of the ideas resonated and became the actual plan for the film.

In his book, Sawyer (2007) described complete concentration with the analogy of a basketball player constantly aware of what teammates and opponents were doing, which facilitated a deeper level of communication. There was some evidence in the animation studio of this level of engagement and complete concentration. One day in the studio, the Rigging student lead stopped to help someone with a work-around for the software. He concluded,

Anyways, I probably gotta go guys, 'cause uh . . . (lowers his voice a little) I worked so much on this the first part of the semester, that right now with my other classes, so now I'm failing in all my other classes (laughs), so I'm like, struggling at the . . . Like (holds out his hand in a claw), I got my fingernails trying to hold on to every single one of them. Like Art History . . . and the film class.

While students were sacrificing other classes to work on the film, others were sacrificing sleep. These examples illustrated a different kind of “concentration” given by group members, consistent with Csikszentmihályi’s idea of concentration, when individuals lose track of sense or time working on a task in flow.

There were other times observed in the video when two or more group members were concentrating on something, and it was apparent that they were concentrating together as might be imagined in group flow, because there were several of the physical signs of group flow, as discussed by Armstrong (2005), including “physical closeness, copying of gestures and phrases, and a quick, fragmented way of speaking where members seemed to be finishing off each others’ sentences” (p. 103-104). These observations suggest that complete concentration in a group project is more of a matter of balancing listening with contributing, rather than having a current status report of where individuals are in accomplishing their tasks.

Conclusions

The university animation studio provided a rich environment in which to observe the elements of group flow articulated by Sawyer (2007) in the context of a studio group project in higher education. Although all of the elements of group flow were not continuously present, many video segments exemplified at least one of the elements of group flow, and there were many instances that exemplified several of the elements, in particular a strong unified understanding of project and people vision/goals for the project; autonomy for students to own portions of the project, as well as contribute to the whole project; and continual communication, including periods of intense concentration and deep engagement, ego-blending, and listening to each other within the group.

Using the consolidated themes of vision, contribution/ownership, and communication proved to be helpful in simplifying the discussion of the elements of group flow, though each of the elements could also be understood on a more specific level. For vision, this context illuminated a co-existence of focus towards both people and project, and how having a vision for both laid a foundation for other elements of group flow. Ownership in the studio meant not only taking initiative to accomplish your own tasks but also taking initiative to pursue the ideas of others and receiving criticism humbly. It also included being open with your expertise with others. Communication in this context was often informal in tone, though through those conversations, the best ideas emerged for the betterment of the film. Communication in this group was more a balance between listening and contributing than simple status reports, allowing each student to be heard and to contribute to the film.

While this study's findings were strengthened by the prolonged engagement with the context through dozens of hours of video recordings of group interactions, there are a few limitations to the findings. Using observation and interviews, it was difficult to capture all of the elements of group flow that were experienced by each participant at any given moment, and footage was often focused on students who were most regularly involved in the project. In addition, this was the study of one studio, and only one cohort in this studio, and thus generalizations are limited without future replication studies.

Future Research

While autonomy was a theme in this study, more research is needed in how students maintain a sense of control throughout a project. From the data, it is unclear how much previous shared knowledge students had from common courses taken or previous group experiences, and how this contributed to their group flow in the animation studio. One theme about ownership

that was not discussed by Sawyer was the concept of needing to take ownership of another person's idea. Being supportive of others' ideas can be seen as a mode of taking ownership in a project, and future research can further explore and verify this theme as contributing to group flow theory

One interesting finding in this study is that group flow may potentially look and feel differently in a large group setting than in a small group setting. In a large group setting, complete concentration may be associated with chatter and small-talk, as well as humor, instead of the silent, lecture-style meetings often portrayed by higher education. Also, in smaller group settings, everyday conversation opened the doors for collaborative problem-solving. More research is needed to indicate whether or not times of communication within small sub-groups was conducive to flow, and whether or not it is related to flow within the entire group.

One finding was that the diversity of student backgrounds seemed to improve the overall foundational knowledge and creativity for the group, not only because the students had diverse backgrounds (Computer Science, Art, Engineering), but also because the students were strongly encouraged by faculty and by group culture to share what they knew. This supports the idea that having interdisciplinary involvement, especially throughout a prolonged period of time, may lead to increased group flow, as well as higher quality, and more creative products. Conducting further research on this topic could provide additional insights into the nature of and importance of interdisciplinary design experiences, which are rare in higher education (Authors, 2015).

Elements of group flow accompanied this successful group experience. However, in addition to suggestions above, more research is needed to understand how professors can best facilitate group flow in collaborative group project settings. These findings could be additionally

influential in providing practical implications for higher education as well as other group work settings.

References

- Amabile, T. M., Conti, R., Coon, H., Lazenby, J., & Herron, M. (1996). Assessing the work environment for creativity. *Academy of Management Journal*, 39(5), 1154–1184.
doi:10.2307/256995
- Armstrong, A. C. (2005). *Group flow in small groups of middle school mathematics students*. Vancouver, BC: University of British Columbia. Retrieved from https://circle.ubc.ca/bitstream/id/58325/ubc_2006-0006.pdf
- Armstrong, A. C. (2008). The fragility of group flow: The experiences of two small groups in a middle school mathematics classroom. *The Journal of Mathematical Behavior*, 27(2), 101–115. <http://doi.org/10.1016/j.jmathb.2008.08.001>
- Author (unpublished). Conceptualizing group flow: A framework for future research.
- Author (2012). Inside the black box: Revealing the process in applying a grounded theory analysis. *The Qualitative Report*, 17(25), 1–23.
- Authors (2011). Beyond transcription: Technology, change, and refinement of method. *Forum: Qualitative Social Research*, 12(3). Retrieved from <http://www.qualitative-research.net/index.php/fqs/article/view/1564>
- Authors (2015). Innovating how we teach collaborative design through studio-based pedagogy. In *Educational media and technology yearbook*, 39, (pp. 147-163). Switzerland: Springer International Publishing.
- Baker, F. A., & MacDonald, R. A. R. (2013). Flow, identity, achievement, satisfaction and ownership during therapeutic songwriting experiences with university students and retirees. *Musicae Scientiae*, 17(2), 131–146. <http://doi.org/10.1177/1029864913476287>

- Bakker, A. B., Schaufeli, W. B., Sixma, H. J., Bosveld, W., & Van Dierendonck, D. (2000). Patient demands, lack of reciprocity, and burnout: A five-year longitudinal study among general practitioners. *Journal of Organizational Behavior, 21*(4), 425–441.
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*(2), 77–101.
- Bryan-Kinns, N., Healey, P. G. T., & Leach, J. (2007). Exploring mutual engagement in creative collaborations. In *Proceedings of the 6th ACM SIG CHI conference on creativity & cognition* (pp. 223–232). New York, NY: ACM. <http://doi.org/10.1145/1254960.1254991>
- Chang, J. W., Huang, D. W., & Choi, J. N. (2012). Is task autonomy beneficial for creativity? Prior task experience and self-control as boundary conditions. *Social Behavior & Personality: An International Journal, 40*(5), 705–724.
- Coakes, E. & Smith, P. (2007). Developing communities of innovation by identifying innovation champions. *Learning Organization, 14*(1), 74-85.
- Csikszentmihalyi, M. (1975). *Beyond boredom and anxiety*. San Francisco, CA: Jossey-Bass.
- Csikszentmihalyi, M. (1990). *Flow: The psychology of optimal experience*. New York, NY: Harper Perennial.
- Csikszentmihalyi, M. (1996). *Creativity: Flow and the psychology of discovery and invention*. New York, NY: Harper Collins Publishers.
- Csikszentmihályi, M. (2009). *Flow: The psychology of optimal experience*. New York, NY: Harper Collins.
- Csikszentmihalyi, M., & Csikszentmihalyi, I. S. (1988). *Optimal experience: Psychological studies of flow in consciousness*. Cambridge, NY: Cambridge University Press.

- Deci, E. L., & Ryan, R. M. (2002). *Handbook of self-determination research*. Rochester, NY: University Rochester Press.
- Duncker, K. (1926). A qualitative (experimental and theoretical) study of productive thinking (solving of comprehensible problems). *The Pedagogical Seminary and Journal of Genetic Psychology*, 33(4), 642–708.
- Florida, R. (2002). *The rise of the creative class*. New York, NY: Basic Books.
- Ghani, J. A., & Deshpande, S. P. (1994). Task characteristics and the experience of optimal flow in human—computer interaction. *The Journal of Psychology*, 128(4), 381–391.
<http://doi.org/10.1080/00223980.1994.9712742>
- Gottschall, H., & García-Bayonas, M. (2008). Student attitudes towards group work among undergraduates in business administration, education and mathematics. *Educational Research Quarterly*, 32(1), 3–28.
- Greenberg, E. (1992). Creativity, autonomy, and evaluation of creative work: Artistic workers in organizations. *Journal of Creative Behavior*, 26(2), 75–80.
- Harackiewicz, J. M., Manderlink, G., & Sansone, C. (1992). Achievement and motivation: A social-developmental perspective. In A. K. Boggiano & T. S. Pittman, *Achievement and motivation: A social-developmental perspective*.
- Haring-Smith, T. (2006). Creativity research review: Some lessons for higher education. *Peer Review*, 8(2), 23–27.
- Hatch, J. A. (2002). *Doing qualitative research in education settings*. Albany, NY: SUNY Press.
- Hirst, G., Knippenberg, D. V., & Zhou, J. (2009). A cross-level perspective on employee creativity: Goal orientation, team learning behavior, and individual creativity. *Academy of Management Journal*, 52(2), 280–293. <http://doi.org/10.5465/AMJ.2009.37308035>

- Jang, H., Reeve, J., & Deci, E. L. (2010). Engaging students in learning activities: It is not autonomy support or structure but autonomy support and structure. *Journal of Educational Psychology, 102*(3), 588–600. <http://doi.org/10.1037/a0019682>
- Kanter, R. M. (1983). *The change masters: Corporate entrepreneurs at work*. New York, NY: Simon & Schuster.
- Karau, S. J., & Williams, K. D. (1993). Social loafing: A meta-analytic review and theoretical integration. *Journal of Personality and Social Psychology, 65*(4), 681–706. <http://doi.org/10.1037/0022-3514.65.4.681>
- Kenner, K. (2015) From the web: BYU animation wins Student Emmy, praise from Disney/Pixar. *Daily Herald*. Retrieved May 13, 2015, from http://www.heraldextra.com/news/from-the-web/from-the-web-byu-animation-wins-student-emmy-praise-from/article_85107094-4c0e-5c2b-8785-4f5e499e4385.html
- King, N., Anderson, N. R., & West, M. A. (1992). Organizational innovation: A case study of perceptions and processes. *Work and Stress, 5*, 331-339.
- Kirsten, B., & Du Preez, R. (2010). Improvisational theatre as team development intervention for climate for work group innovation. *SA Journal of Industrial Psychology, 36*(1). <http://doi.org/10.4102/sajip.v36i1.862>
- Latham, G. P., & Yukl, G. A. (1975). A review of research on the application of goal setting in organizations. *Academy of Management Journal, 18*(4), 824–845. <http://doi.org/10.2307/255381>
- Linder, J. C., Jarvenpaa, S. L., & Davenport, T. H. (2003). Toward an innovation sourcing strategy. *MIT Sloan Management Review, 44*(4), 43–49.

- Lizarraga, M. L. S. de A., Baquedano, M. T. S. de A., & Oliver, M. S. (2010). Stimulation of thinking skills in high school students. *Educational Studies*, 36(3), 329–340.
<http://doi.org/10.1080/03055690903425003>
- Locke, E. A. (1968). Toward a theory of task motivation and incentives. *Organizational Behavior and Human Performance*, 3(2), 157–189. [http://doi.org/10.1016/0030-5073\(68\)90004-4](http://doi.org/10.1016/0030-5073(68)90004-4)
- Merriam, S. B. (1998). *Qualitative research and case study applications in education* (Second edition). San Francisco, CA: Jossey-Bass Publishers.
- Miranda, S. M., & Saunders, C. (1995). Group Support Systems: An Organization Development Intervention to Combat Groupthink. *Public Administration Quarterly*, 19(2), 193–216.
- Montuori, A., & Purser, R. E. (1999b). Social creativity: Introduction. In A. Montuori & R. E. Purser (Eds.), *Social creativity* (Vol. 1, pp. 1–45). Cresskill, NJ: Hampton Press.
- Nakamura, J., & Csikszentmihalyi, M. (2009). Flow theory and research. In C. R. Snyder & S. J. Lopez, *Oxford handbook of positive psychology* (pp. 195–206). Oxford, NY: Oxford University Press.
- Reigeluth, C. M., & Garfinkle, R. J. (Eds.). (1994). *Systemic change in education*. Englewood Cliffs, NJ: Educational Technology Publications.
- Salanova, M., Bakker, A. B., & Llorens, S. (2006). Flow at work: Evidence for an upward spiral of personal and organizational resources. *Journal of Happiness Studies*, 7(1), 1–22.
- Sawyer, R. K. (2003). *Group creativity: Music, theater, collaboration*. Mahwah, NJ: Lawrence Erlbaum Associates, Inc.
- Sawyer, R. K. (2006a). *Explaining creativity: The science of human innovation*. Cary, NC: Oxford University Press, Inc.

- Sawyer, R. K. (2006b). Group creativity: Musical performance and collaboration. *Psychology of Music, 34*(2), 148–165. doi:10.1177/0305735606061850
- Sawyer, K. (2007). *Group genius: The creative power of collaboration*. New York, NY: Basic Books.
- Shernoff, D. J., Csikszentmihalyi, M., Schneider, B., & Shernoff, E. S. (2003). Student engagement in high school classrooms from the perspective of flow theory. *School Psychology Quarterly, 18*(2), 158–76.
- Stake, R. E. (1995). *The art of case study research*. Thousand Oaks, CA: SAGE Publications, Inc.
- Sternberg, R. J., & Williams, W. M. (1996). *How to develop student creativity*. Alexandria, VA: ASCD.
- Strauss, A., & Corbin, J. (1990). *Basics of qualitative research: Grounded theory procedures and techniques*. Newbury Park, CA: Sage Publications, Inc.
- Vera, D., & Crossan, M. (2005). Improvisation and innovative performance in teams. *Organization Science, 16*(3), 203–224. <http://doi.org/10.1287/orsc.1050.0126>
- Weick, K. E. (1998). Introductory essay: Improvisation as a mindset for organizational analysis. *Organization Science, 9*(5), 543–555.
- Weick, K. E., & Roberts, K. H. (1993). Collective mind in organizations: Heedful interrelating on flight decks. *Administrative Science Quarterly, 38*(3), 357–381.
- Weldon, E., & Weingart, L. R. (1993). Group goals and group performance. *British Journal of Social Psychology, 32*(4), 307–334. <http://doi.org/10.1111/j.2044-8309.1993.tb01003.x>
- West, M. A., & Anderson, N. R. (1996). Innovation in top management teams. *Journal of Applied Psychology, 81*(6), 680–693. <http://doi.org/10.1037/0021-9010.81.6.680>

Woolley, A. W., Chabris, C. F., Petland, A., Hashmi, N., & Malone, T. W. (2010). Evidence for a Collective Intelligence Factor in the Performance of Human Groups. *Science*, *330*, 686–688.

Wuchty, S., Jones, B. F., & Uzzi, B. (2007). The increasing dominance of teams in production of knowledge. *Science*, *316*(5827), 1036–1039.

ARTICLE 3:

THE ROLE OF TEACHERS AND PEER LEADERS IN SUPPORTING GROUP FLOW

Abstract

In this study, we report the findings from a qualitative study of the role of teachers and student leaders in fostering group flow in a university center for animation that emphasized cohort-based group projects. We found that student leaders can encourage group flow by providing vision, isolating work tasks, listening to and incorporating feedback, and fostering friendship and communication among group members. Professors can facilitate group flow through defending student autonomy and choice, teaching collaborative skills, collaborating between college departments, bringing awareness to project bottlenecks, and connecting students to the industry. These findings, illuminated through thick description of the animation context, help explain some of the roles and strategies that student and faculty leaders can use to promote group flow in higher education settings.

Keywords: group flow, higher education, studio, team productivity, professor role

Introduction

As businesses and organizations increasingly use groups to produce more complex and creative products (Hirst, Kippenberg, & Zhou, 2009), there is a surge of interest in enhancing creativity in higher education, especially in groups, to prepare students with the necessary skills to contribute in those kinds of work environments. As a result of this interest, many colleges and universities are creating centers and programs to foster student creativity and collaboration (Haring-Smith, 2006). However, group work is not always effective, and is often unpopular among students (Gottschall & García-Bayonas, 2008). While group work is not inherently creative, Sawyer (2007) proposed a theory for creative collaboration, composed of 10 specific elements that describe a state of group flow that may accompany a higher level of group satisfaction and creativity.

Sawyer (2006) defined group flow as peak group performance, where, similar to individual flow (Csikszentmihályi, 2008), the group reaches a collective state of consciousness where “everything seems to come naturally; the performers are in interactional synchrony” (Sawyer, 2006, p. 158). Although Sawyer (2003) believed that group flow is an emergent property of the group as a whole, related research suggests that a group leader or a professor may be able to encourage or facilitate certain elements of group flow (Amabile & Fisher, 2000; Ankrah & Omar, 2015; Reeve, Deci, & Ryan, 2004; Walters, 2005).

Group flow provides a framework for looking at processes that should lead to creativity and other positive outcomes such as motivation for learning (Vollmeyer & Rheinberg, 2006), product quality, participant engagement, and enjoyment (Baker & MacDonald, 2013). However, there has been very little research using group flow theory to study group processes, outside of middle school mathematics education (Armstrong, 2008) and recreational music composition

(Bryan-Kinns & Hamilton, 2012). The studies that have been done talk mainly about the flow experience for group members, without focusing on ways to prepare for or invite it. As universities organize more studio environments and group projects, Sawyer's theory of group flow could provide a framework for gaining insights into ways to teach groups to work together effectively in a state of flow to produce more creative products and enhance the collaborative experience for each of the group members. Therefore, the purpose of this research is to understand ways to facilitate group flow in higher education studio settings.

Literature Review

In explaining his concept of group flow, Sawyer (2007, p. 44) suggested 10 main conditions that define the experience of group flow for a group:

1. Having a specific goal in mind
2. Close listening
3. Complete concentration
4. The autonomy of being in control of actions and environment
5. Blending egos
6. Equal participation
7. Familiarity
8. Communication
9. Moving it forward
10. Potential for failure

Among areas influencing those 10 conditions, there are many that are entirely dependent on the decisions and actions of each of the individual group members, but there are three in particular that seem like they may have significant implications for a professor or leader of the group: (a) the selection of a task or goal; (b) the selection of group members who can blend egos, participate equally, and be engaged enough for close listening; and (c) setting up an environment

for group collaboration, including opportunities for frequent/continuous communication, autonomy, and the potential for failure and overcoming failure.

Task Selection

When it comes to group flow, not all tasks are equally as likely to engage group members to experience group flow, or group productivity in general. Research on group behavior suggests that the nature of the task itself can have a significant impact on the behaviors of the group (Hackman, 1987; Karau & Williams, 1992), and having a specific task or goal in mind is one of the most important factors in determining group effectiveness (Guzzo & Shea, 1992; Weldon & Weingart, 1993). In reviewing group behaviors, Hackman (1987) noted, “the relationships obtained appear to depend substantially on the properties of the group task being performed. Findings for one type of task often turn out not to hold for groups working on different kinds of tasks” (p. 318).

One of Sawyer’s (2003) main premises of group flow is that “Group flow is more likely when the extrinsic collective goal is matched by the number of pre-existing structures shared and used by the performers” (p. 167). This suggests that a selected group goal should be appropriate for the previous experiences and skills of the group members. Although Sawyer acknowledged that the group goal can change over time, the complexity of coordinating even the original goal seems to suggest that this particular element of group flow may be heavily influenced by a unique leader—initially and also intermittently throughout the project. When Sawyer (2007) discussed task selection, he described it in terms of a paradox of “establishing a goal that provides a focus for the team—just enough of one so that team members can tell when they move close to a situation—but one that is open-ended enough for problem-finding creativity to emerge” (p. 45). However, Sawyer (2003) suggested that for more task-oriented groups, the

“extrinsic collective goal” can be generally implied by a deadline, a specific question or a problem to solve (p. 168). Also, Sawyer (2007) advised that a problem-solving creative task should be one where the goal is well understood and can be explicitly stated.

Not only must the goal provide a specific vision for a group, but it must be an engaging goal or task, equal to the skills of those in the group. Several studies have concluded that some activities are more conducive to flow than others. For example, in sampling university students and retirees for individual flow, Baker and MacDonald (2013) found that music-composition measured higher in flow than sports, dancing yoga, and music performance. In sampling individual university students in an architecture program, Fullagar and Kelloway (2009) found that “engaging in tasks that require complex skills, resolving challenging problems and expressing creativity leads to the experience of flow” (p. 609). This suggests that a professor or leader can enhance group flow by carefully selecting a task that requires complex skills and creativity, rather than a task that can be accomplished just as well alone.

In addition, the task must have some level of risk to it, and potential for failure. “There’s no creativity without failure, and there’s no group flow without risk of failure” (Sawyer, 2007, p. 55). This suggests that group flow may be encouraged by tasks that have some element of risk—a sense that the result of the task really matters. With the risk of failure as a condition of group flow, group flow requires similar real-world scenarios, but with actual real-world applications where the solutions are used and thus have real meaning. In explaining the nature of authentic activities in constructivist learning environments, Wilson (1996) clarified: “The aim of an authentic activity is not just to simulate or replicate the physical environment, calling it ‘authentic.’ Rather, the aim is to design an environment in which learners use their minds and

bodies as they would if they were practitioners in a domain” (p. 20). This suggests that a certain level of risk is appropriate for making the task feel authentic, leading to a better experience.

Selecting a task or group goal that is appropriate to the skills of all group members and that has an element of risk is one way that a professor or leader may facilitate group flow.

Group Member Selection

Many studies in organizational behavior have observed how groups function differently depending on the group members involved. As organizations continue to form groups with more diversity, diversity in groups has become a popular topic among management teams (Van Kippenberg & Schippers, 2007). However, research regarding group diversity has been inconclusive, showing that some diversity in groups can have positive effects on group performance (Bantel & Jackson, 1989), negative effects on group performance (Murnighan & Conlon, 1991), and both positive and negative effects on group performance (Watson, Kumar & Michaelsen, 1993), suggesting a complex link between group diversity and team performance (Van Kippenberg & Schippers, 2007).

Sawyer (2007) suggested that the level of diversity of group members could be effectively influenced by the type of task, whether problem-finding or problem-solving. This suggests that the type of task may need to determine the diversity of group members working on the task. For example, he suggested that problem-finding tasks could benefit from more diversity, whereas it can be more productive in problem-solving groups for group members to already have worked together, and to be familiar with how other group members function. Also, for problem-solving groups, it may be helpful to change out individuals over time to introduce new ideas and perspectives. This is supported by a study of bank management, in which it was

found that the more innovative banks were managed by more educated teams with varying areas of expertise (Bantel & Jackson, 1989).

In order to achieve group flow, a problem-solving group requires members to have worked together before, to share the same knowledge and assumptions, and to have a compelling vision and shared mission in order to experience flow (Sawyer, 2007). However, other research has shown that if a group needs to find and define a new problem, too much shared information can become a problem. “Problem-finding groups are more likely to be in group flow when there’s more diversity; problem-solving groups are more effective when more tacit knowledge is shared” (p. 52-53). Some research supports Sawyer’s (2007) opinions on group diversity, for example Pelled, Eisenhardt, and Xin (1999) studied the types of conflicts that arose from different types of diversity in groups and how they affected group performance. Through this study they found that task conflict often occurs as a result of different backgrounds of how to complete the task, while race and tenure diversity can spark emotional conflict. However, age diversity seemed to minimize emotional conflict. Also, task routineness and group longevity moderated these relationships.

At the same time, the familiarity between members must also be kept in balance. After 2-3 years, a group can become less effective because everything is shared and no surprises are left—they don’t feel like they have to communicate what is going on because of a feeling of implied understanding (Weick & Roberts, 1993). In addition, researchers of groupthink have found that some groups can become complacent and seek to please each other for the sake of consensus rather than seek new outcomes (Miranda & Saunders, 1995).

While group diversity seems to be a delicate issue, Sawyer emphasized the need to select group members with similar enough backgrounds and experiences to facilitate understanding

how to work together. These group members should feel confident in their abilities to succeed in a particular task, in order to achieve group flow. This might also include creating systems to allow students to self-organize.

Environment

Recent research in organizational creativity seeks to find ways to construct physical and cultural work environments that facilitate creativity (Zhou, 1998). However, in researching individual flow, Csikszentmihályi (1975) acknowledged that establishing the environment for flow was not an organizer's role alone, because flow also depended on an individual's ability to restructure the environment so flow could occur (p. 53). Similarly, establishing an environment for group flow is not a task to be completed before the group comes in to play, but a culture that is malleable enough to change and provide autonomy to group members as they take charge of their own learning.

In their study of creative classroom environments in higher education generally in which they reviewed course syllabi, conducted interviews with professors and students, and observed classrooms, Cole, Sugioka and Yamagata-Lynch (1999) determined four areas to be important characteristics of a supportive environment for fostering creativity (p. 283):

1. Personal professor-student relationship
2. Assessment
3. Openness and freedom of choice
4. Classroom activities

This study provided evidence that establishing the environment for group flow comprises not just setting up chairs differently, but the combination of task selection, group members, feedback, and a personal relationship with the professor. Many of these factors are included in discussions of considerations for achieving individual and group flow, possibly because they contribute to the individual's sense of autonomy or control in the task. In describing how to

achieve group flow, Sawyer (2007) incorporated the Self-Determination Theory by Deci and Ryan (2008) when he quoted the three main basic learner needs identified by the theory: “Group flow increases when people feel autonomy, competence, and relatedness” (p. 49). Self-Determination Theory assumes that “Students possess inherent needs and growth propensities to seek out and constructively engage in their classroom surroundings. These classroom surroundings, in turn, feature a host of influences that affect students’ daily motivations and longer-term motivational development, influences such as interesting things to do and an instructional agenda to follow” (Reeve, 2006). According to Self-Determination Theory, professors can significantly impact a student’s sense of autonomy, not by giving it to them, but by encouraging it in themselves. As Reeve, Deci and Ryan (2004) emphasized,

Professors cannot give students an experience of autonomy, they can only encourage it. Even when professors provide students with choices and options, students often do not experience autonomy (Reeve et al., 2003). Instead, what professors can do is provide classroom supports for students’ perceived autonomy, competence, and relatedness, create opportunities for students to align their classroom activity with their innate and developing inner resources, and patiently support the students to become engaged. (p. 45-46)

In other words, professors can provide a classroom environment that encourages a student’s perception of autonomy, competence, and relatedness, and provide opportunities for a student to develop in areas of personal interest and resource. Specifically, Reeve and Jang (2006) expounded on specific behaviors and words that professors use that can support student’s autonomy during a learning activity, including: Creating opportunities for students to work in their own way, providing opportunities for students to talk, arranging learning materials and seating patterns so students can manipulate objects and conversations rather than passively watch and listen, and communicating a clear acknowledgement of students’ perspectives. In a more recent study, Jang, Reeve, and Deci (2010) observed the classrooms of 133 high school teachers and had the students in 84 of those classrooms take an anonymous survey to rate their class

experiences, responding to questions regarding individual and collective engagement. Through this study, Jang et al. clarified that supporting autonomy is not just letting students do as they please, but a combination of structure and supporting students in their decisions that is most effective in engaging students in learning activities.

Group flow is an emergent creative process that fosters individual flow. While group flow depends on many factors outside of the control of a professor or leader, research suggests that a professor or leader may be able to facilitate group flow through task selection, group member selection, and creating an appropriate environment for group flow. However, more research is necessary in order to validate these claims and explain how a professor or leader can most effectively enact these principles. Understanding how leaders facilitate group flow, especially in a higher education studio setting, can provide insights that will allow professors to be more effective in fostering group flow in related educational settings, giving students the ideal opportunities to enjoy working successfully towards increased collaborative creativity.

Research Purpose

In this study, we sought to understand how professors and student leads facilitated group flow in one academic design studio noted for its effectiveness and creativity. Specifically, the research question for this particular study was: How can teachers and peer leaders encourage group flow in creative, collaborative groups?

Research Context

This study was conducted with the Animation Studio at a large university in the intermountain west. This studio is an environment where students together create a senior animated film. Though the studio has gone through several changes since its creation, the resulting films from the Animation Studio have repeatedly received national recognition for

quality and creativity, winning 17 student Emmys in 12 years, while also receiving recognition for their uniquely collaborative approach to projects (Kenner, 2015). Author (unpublished) found that many of the elements of group flow were present in the studio, making it an ideal context in which to study the teaching and leadership roles within the studio. Thus, this studio was selected for this study because of this evidence for group creativity as well as group flow.

Data Sampling and Collection

During the 2010-2011 school year of the Animation Studio, over 60 hours of video footage was recorded in multiple settings, including formal interviews with professors and student leads, as well as recordings of their *Daily* work review meetings, and student interactions in the computer lab, or studio, where they worked. These *Daily meetings* were given that name to mimic their role in industry, where they happen daily. In this context, they occurred twice a week for an hour. During *Daily meetings*, video footage was taken from the back of the room, using a shotgun microphone for sound. This was to be able to capture the authentic events of the meeting, being as unobtrusive as possible. However, it was not always sufficient for capturing every word of every participant. In addition, not all students were visible during all video segments, so not all comments could be attributed to specific students. Students and instructors were sampled for interviews based on their role in the project (for example, the student director and student producer, or a team lead for lighting and production).

Data Analysis

This study used thematic analysis (Braun & Clarke, 2006) to identify emerging themes from the data. All 60 hours of video footage were initially analyzed and categorized, in conjunction with relative memos (Author, 2012) and regular research journal entries. In the memos and themes, some video clips were noted for a significant role of professor or student

lead. When these initial segments were identified, they were then aggregated into themes, using thematic analysis methods and then typological methods described by Hatch (2002) to understand those themes in terms of categories from Sawyer's (2007) theory of group flow.

After identifying and coding themes in the data and representing these themes in an Excel spreadsheet, I analyzed each theme to identify the clearest examples of each of the main themes and sub-themes. Only after identifying the best examples were they transcribed in order to allow for direct quoting in the write-up, though this process sometimes led to further categorization and re-analysis, due to the overlapping nature of several of the elements of group flow. The names of participants mentioned in this report have been changed for confidentiality.

Trustworthiness

The emerging themes discussed in this study were found to be similar between participants and across segments, whether they were in the studio setting or in formal interviews, demonstrating triangulation. In addition, the 60 hours analyzed represent a prolonged engagement (Lincoln & Guba, 1985) with 60 hours of video data spanning a year of animation production. However, because the data was collected over five years ago, we were unable to perform member checks. As the primary researcher, I performed the data analysis in counsel with my committee, receiving their input and feedback on the process and findings. In addition, I kept an audit trail through regular research journaling.

Findings

Many elements of group flow were present in the animation studio setting (Author, unpublished). Professors and student leads had different roles within the project, but each role was important in facilitating different conditions of group flow. Student leaders encouraged group flow by providing vision in the task selection, isolating work tasks to provide

opportunities for individual creativity, participating as an equal group member by listening to and incorporating feedback, managing feedback in meetings, and fostering a friendly and collaborative environment among group members. Professors were particularly instrumental in creating a sense of ownership for group members individually, and by creating a culture and environment that fostered group flow. They did this by defending student autonomy and choice, even though it increased the potential for failure; teaching collaborative skills; increasing the diversity of group membership by developing a program that was supported by three different college departments; bringing awareness to project bottlenecks, and connecting students to the industry. These findings are somewhat consistent with the literature, suggesting that professors and student leads do facilitate group flow through task selection, group member selection, and a supportive environment, though some of the methods suggested by this study are unique to the literature.

Student Lead: Visionary, Motivator, Peer, Communicator

There were many sub-groups working on different tasks for the Animation Studio—Art (creating the concept art for the characters and environments of the film), Lighting (creating the right warmth and angles for lighting in a shot), Textures (creating a texture for a shape or character, such as wood, or brick, or haze), Character Development (creating the character, from 2-D to 3-D, including personality and characteristics), and Rigging (programming an object or character to be able to move)—and each of these sub-groups had a team leader. Although all of the students working on the film voted for the student director and student producer, the other student leads emerged organically because of their effort, expertise, and relationships with the team.

Working with the other students as their leader was rewarding but also challenging for the student leads. Early on in the year, one of the student leads talked about what it was like to be a team leader:

It's an eye-opening experience. It's not what you expect. Especially, you know, trying to juggle school and work, and then at the same time being accommodating in a group setting for everyone. Because sometimes we don't necessarily agree on stuff, a lot of times I don't know what's going on with things that are being discussed, like I find out about it later, and what not. And so it seems just kinda, maybe disorganized? I don't know...And, yeah. I don't know how much of ...a leader I actually am.

This student's description of his experience is aligned with the realities of group work as well as the image of what a leader could feel like according to Sawyer's (2007) theory of group flow—an experience that evolves and changes with the group. Because of this, group leaders in group flow may sometimes feel more like participants than leaders. Instead of feeling like they are conducting progress, strategically making decisions for the group, they are contributing members of the group who listen to what others have to say and watch as the team fails and succeeds together. However, for this project, student leads did provide leadership and assisted group flow through task selection and environment, specifically by providing the vision for the end goal, structuring the project for student initiative, and communicating with group members.

Task selection. Student leads were influential in the task selection for the project by providing the original vision for the senior film. Student leads helped each of the teams understand the original vision for the film. In the following example, the student director (names have been changed) discussed the personality of the main character in the film, Clarence:

Brian: Pretty much Clarence's personality is one of, not to go to too much extreme, but hopeful desperation kind of a thing. (a student nods) Think about maybe he's just lost his business, he's just now getting to the verge of like, Okay, holy crap, now I'm out of food, now I'm out of money. (turns towards students who are nodding) What am I gonna do? So, he's down, but he's not defeated. (student nods)

Michelle: (Sitting next to him, turns to him and asks a question, inaudible)

Brian: Right. So his personality is... (Michelle interjects, inaudible) What we could do, yeah. (Megan laughs) He'd be friendly, but also be a little shy. Humble about his situation.

Dave: Is he pretty insecure?

Brian: Um, no. Not so much insecure, he definitely believes in his own abilities to accomplish things. Just kinda down on his luck is all.

Travis: Does he come from a privileged life? Like is this something recent past, or has he always had a past?

Brian: No, he's not necessarily privileged, but comfortable. I imagine him, this is gonna sound like ridiculous, so feel free to laugh, as a local shoe-maker, cobbler. (Jessica: Oh, that's cool! I like that.) And so, he's lived comfortably, but you know, he's never really, he's never been affluent.

Travis: Okay.

In this segment, Brian, the student director, provided the original vision of what he saw for Clarence, but the other student leads asked questions to get a deeper understanding of the character and Brian's vision for him. By sharing in this experience, the student leads gained a better understanding of Brian's vision for the Clarence character, not only for themselves, but one that was shared across other student leads that they could also share with their teams.

Environment. The student leads enhanced group flow through the environment by structuring the project for student initiative and communicating with group members.

One of the conditions of group flow according to Sawyer's (2007) theory is that group members feel that they are in control of their actions and environment, and that can be difficult in a group setting where the group may choose something different than an individual might wish. But all along, student leads provided options for the students, giving them control over what they worked on and how they went about it, while using the original vision to build new ideas.

During a *Daily meeting* early on in the project, the student producer asked the student Artistic Lead to list the characters and environments that needed to be created. They listed the

street, the butcher shop, and the referee for the boxing match; and then the artistic lead brought up some ideas for the character of the referee. Then another student, who was not a student lead, thought of another question:

Jessica: Um, I have an idea, I'm not sure if it's, like, pertinent right now. But we were talking about how boxing can be a gentleman's sport, I was thinking, I dunno. It is kind of like, it's more like, bringing out that side of Paddy? Like, maybe he's like... I dunno

Travis: Yeah. That's a good contrast.

Megan: Yeah, there could be like girls...

Chris: We were actually thinking of doing that with him. Like he's very refined in his dress...

Jessica: Yeah!

(Megan giving an idea, talking to Jason, Jason starts laughing)

Chris: In his attire, in his... Monocle (pretends to hold a monocle to his eye, students laugh)

Jessica: Yeah, and he's covered in ...(inaudible)

Chris: (students laugh) But we do want him to be menacing at the same time. So, we were thinking, that definitely he's dressed very nice (motioning with hands, girl nodding), he's well-groomed, he's shiny, he's like a baby pig (pats his cheeks), in his skin, he's taken care of....

Jessica: Yeah.

Jason: He's given a cigar for a sec...

Jessica: (Turns around to face Jason, smiles) Yeah...

Chris: Yeah! (Like, yeah, we could do that)

Justin: He could be reading from his book (smiles, acts out Paddy reading)

Chris: Oh Yeah. We're definitely thinking that.

Travis: Having some tea... but he constantly... uh, yeah... (someone comes in the room with a question for Travis)

Jessica: He's a boxer, and he likes um, the...

(video turns to Travis's conversation, but the main conversation continues, video turns back)

Justin: The only question in my mind is that, he's gonna be chowin' down on his food,... (Jessica: Yeah.) and I imagine him like... (growls, pretends to be holding meat), like Jabba, but then how is he gonna be refined as well?

Chris: I don't know, we were thinking he'd be refined, and then all of a sudden just go (growls, hovers over the desk, pretending to be attacking some food) (students laugh)

Megan: (laughs), or he could have like a little kerchief that he like, holds at his... (motions like she's dabbing her mouth properly with a napkin)

(Jessica and Girl 3 talking and laughing about another inaudible idea)

Jason: After he chomps on it... Yeah, after he devours it, he's like (motion with handkerchief)...

Megan: Just kind of and then you know, just like...

Chris: Or have somebody else wipe his mouth for him (students laugh).

Jason: Oh yeah! (laughs)

Justin: That's a really good idea.

Cory: And he could have like a little mustache laugh (laughs)...

Justin: Or he could even be sitting at a table (motions like he's holding a fork and knife)...

Chris: Sitting with his boxing gloves on!

This segment demonstrates some of the elements of group flow that were common in group conversations. Students offering new ideas were immediately validated. Students also used hand movements to convey ideas and seemed to understand each other without having to worry about careful articulation. Some of these ideas mentioned in this conversation eventually became part of the animation. This is one of several examples of how the students took the original idea and expounded on it, to improve the ideas as a group.

Sawyer (2007) discussed that in group flow, group members feel that they are in control of their actions and environment, and, as this example shows, that can be difficult to do in a group setting where the group may choose something different than an individual. But all along,

student leads were providing options for the students, giving them control over what they worked on and how they went about it, while reminding them of the original vision.

Having a clear vision of the end goal allowed student leads to isolate the tasks that needed to be done and gave other students the opportunity to volunteer to complete those tasks. In the *Daily meetings* there were at least a couple times when the student leads were going through a list of tasks to be done, and then they waited for students to volunteer to take on a particular task. Student leads would usually only ask someone to take on a certain task after offering that task to the whole group, asking if anyone wanted it. By allowing students to choose the tasks they were responsible for, student leads offered additional control and autonomy to students working on the film.

On this project, student leads also made an effort to keep things positive. Feedback was straightforward about what needed to be changed, and praise was offered after almost every task presented in *Daily meetings*. This helped students feel safe to do what they could. Jason, one of the student leads, described how having a positive outlook helped students gain trust in the process, which he believed was necessary to allow students to feel safe about continuing to “own” and work on the project:

You have to keep the morale up of the film, because this is, for this specifically, this is a volunteer thing. And people are volunteering lots of their time. And as soon as someone starts . . . saying negative things about a film, it can spread really fast. . . . So you always have to show confidence about improvement of the film. Now I don't mean to say . . . you don't need to fake kind of a positive outlook. You need to be real about what's going on. But show that you're willing to work hard and have a confidence structure that you're setting up, that people can be confident in what's going on, and just kind of try to avoid those negative attitudes about stuff. And always, try to look for positive feedback too. Be realistic, but don't, don't like . . . (smiles) so that's the hard part, because you do have to give a good critique, but you also have to keep the morale up. And um, gain their trust in the whole system.

One of the most significant ways the student leads facilitated ownership and contribution was by personal example of not getting upset when their ideas were not chosen, incorporating feedback, and participating equally with others in the group.

In one segment, there was an interesting conversation between two students, Chris, the student producer, and another volunteer, Nathan, working on the film. Nathan had served as a producer on two previous films and had also had an internship with Pixar, and he was offering some time management advice to the student producer. This was an excellent example of blending egos, because even though Chris was the student producer, he took the time to hear Nathan out, and to discuss with him the issues that he believed needed to improve in order to help the group work more effectively, specifically about budgeting student time and prioritizing tasks to be done. This small conversation then spun a discussion with other group members about the current project bottlenecks and how budgeting and prioritizing time could help improve efficiency. This example demonstrated how the student leads also facilitated autonomy by welcoming advice from other group members.

For the student leads, facilitating group flow was often a matter of facilitating communication between group members. That included making themselves available to group members, getting the right people together for the right conversations, and helping group members get to know each other. The student leads created the culture for communication that allowed for group flow.

First of all, the student leads made themselves available for group members, and for some of them, that meant being physically present in the studio setting where students often did most of their work. The student director explained what he thought was his role in communicating with group members:

There is something about being involved in a collaborative group effort that is also enticing. You just want to be around. And especially with me being in a position that I am as a director, it's, for the film, important that I am there, you know. I can't have people trying to get things done and then not able to reach me or contact me, you know. I've made, like my personal contact information open, and I've you know, taken calls where I can't be in the lab, just whenever—all night. And a lot of it just comes down to being in the lab for the majority of the day. You know, if you're in the lab from like 10 in the morning to about 6 in the evening, chances are you're gonna get a good cross-section of everyone working on the film, so you have that time to personally interact with those who are working on it.

This example suggests that facilitating communication for group flow means working on the project when others are working on the project, and making yourself available for others who are working at other times. But this suggests it could also mean being in the same physical space. Student leads often discussed during *Daily meetings* the scheduling of future meeting times so that the most people were present to get a general consensus. Brian would also ask people to stay longer after a particular meeting to get more details on their work. At least for this group, student leads being physically present during *Daily meetings* and even working in the lab on the project facilitated additional communication for group flow.

In addition to planning organized times for communication on the project, the team leads initiated many of the social events, providing opportunities for group members to communicate in off-topic contexts. As one *Daily meeting* concluded, one student suggested scheduling another group activity outside of the project:

Brian: Finish mode, finish mode, finish mode. Lets' get stuff done. You are all of you making great progress on the things that I'm seeing...you guys are doing really great. Really, really great. With that, Zach?

Zach: Speaking of which, should we have another scheduled video game night?

Brian: I think that would be great. Now, we need to be sure that if we schedule another video game night, we need to hold to it. Because Chris felt very, very sad (Zach: Yeah...) that last time we had a video game night, not very many people came... So I think that'd be a good idea. Let's... let me say like, not this coming...

Zach: Thanksgiving.

Brian: Thanksgiving's coming up.

Another student (unrecognizable): Two weeks!

Brian: Is that when it is?

Another student: Yeah.

Brian: So, should we try and maybe set something up for this Friday evening?

Girl: Isn't this semester ending the week after Thanksgiving?

Jessica: Two weeks after Thanksgiving.

Zach: Who here likes video games, anyone?

(Students raise hands, some say, I do! Others start chatting)

Zach: We all like video games, we should be here!

Brian: Should we say like this Friday, 7:00 here? (some say "yeah!" students continuing to chatter)

Brian: Also, Dave has given us permission, we can also watch a film down here (points behind him to the screen) But let's, let's get together and have a fun evening.

Several times throughout the school year they had parties, both to celebrate and just to get to know each other better. Gatherings included game nights, video game nights, and movie nights, and they did seem to help facilitate friendship and trust among group members, which enhanced group flow when they were together discussing project-related things.

Professor: Mentor, Mediator, Reviewer, Advocate

During *Daily meetings*, one or two professors usually participated from the back row of the theater setting where *Daily meetings* were held. They often suggested some fixes, citing previous challenges or experiences that students had undergone with other films. About once a month, a professor would start out the *Daily meeting*, either introducing a guest, giving important information about job recruiting, or even taking the entire meeting time to go over a specific topic for the students, such as learning to write a cover letter and resume, or watching examples

of other short animation films. The professors were not regular participants in the studio setting, though students often mentioned meeting with professors outside of class. Interviews with students and professors revealed the professors' roles in assisting to create the environment—the group, the project, and the group culture—that could enhance the group cohesiveness and productivity, or group flow.

Task selection. Although the professors let the students choose the project for themselves through voting, the professors were group participants in providing insight into the project selected, and bringing awareness to project bottlenecks. The professors involved in overseeing the student film had the advantage of previous years of experience working with students to create an animation short. The professors often contributed their own personal opinions, as members of the group, as to what colors the wood should be, and how to conclude the story. However, other times the professor spoke up to warn students about the paths they were pursuing. Dave, the director of the program, was adamant that the process needed to be done shot-by-shot rather than task-by-task. He guided the students, telling them that other films had failed by trying to get all the lighting done, or all the textures done, before moving on. He specifically warned them that they needed to do it shot by shot, getting as much done as they could for the shot so that the students could see earlier on the problems that existed. Another clip showed Dave talking with the student leads about a year later, working with them to re-organize their efforts and get back on track for reaching their deadlines. The student leads drew on the whiteboard a proposed new work process to help them reach their goals, and Dave wanted to emphasize the importance of getting one shot done before going on to another step.

Dave: (at the whiteboard, looking at the diagram of a new suggested work flow process) So what I'm saying is let's still find a few of those shots (circles the part in the process with a finished shot) and let's get them lit in the next few days. Not a long time, but in the next few days. We'll know more about where we are if we can do that. So I want to be in

here (draws a circle to draw attention to an advanced part of the process) on a shot or two in a few days. Now, is it gonna be missing shaders in there and some of ‘em gray? Probably, yeah. But don’t wait to get to there until we get the finished shaders, alright?

Dave recognized that the process was “non-linear,” and “organic,” as it often can be in examples of group flow. Once again the professor provided some assistance and scaffolding, both in warning them of a potential problem area, and helping them get back on track after the students got into those problems.

At a key point in the project, the professor stated that there needed to be a switch from “Experimenting” mode to “Finishing Mode,” encouraging students to mentally and actually try to finish their tasks, instead of experimenting with them. These phrases became part of the vocabulary of the group, as shown previously, and they would refer to them to remind students to make it good enough for the project. They discussed progress differently after that conversation and worked to get things finished rather than perfected.

Group member selection. The professors were primarily responsible for the selection of group members eligible to work on the project, in part through program admission, but predominantly through internal and external program collaboration. One of the unique qualities of this particular studio was that it consisted of faculty and students from multiple departments, including Fine Arts, Engineering, and Computer Science. During one interview, a professor said it was one thing to get the students working together, but it was another to get faculty from different departments to work together to create a new major, and to get support from the university to allow for that kind of cross-disciplinary collaboration. Geoff Hoffman remarked,

The one thing that I’ve noticed, is programs’ and departments’ success and failure rate isn’t based on their students, it’s completely connected to the faculty. . . . We were set up in the same year that another school in the Rocky Mountain region was set up. And you know, at this point we were nine student academy awards, or four student academy awards and nine student Emmys into the process, and these guys hadn’t even finished a film. And they came to us and spent two days with us and watched our films and watched what we do with the students, and in all honesty, they know the software way better than

we do. But what you realize is that they didn't understand the process, the production process. They didn't understand how to work together as faculty to then make it work for the students.

However, the faculty each mentioned that this was a really important part of what made for the success of the studio, because the faculty did not "look the same" in their backgrounds and expertise.

Pete described how the advantages for the students outweighed the administrative challenges of overseeing an interdisciplinary program within a college:

We get a lot of feedback from studios. . . . And a lot of times, more often than not, they say, well how do you guys do these big projects? Because not many schools recreate this kind of studio environment with their students. And a lot of it is due to the collaborative nature of the [university] Animation Studio, the fact that students have resources in visual arts, and resources in theater and media arts, and then also resources in the college of engineering, where the super computer is housed. So they have resources within the university to get the film done. That's very, very rare. In fact, I don't even know of another university, or even an arts school, that allows students to utilize the resources that they need throughout the university to get the best product that you can. It's an administrative nightmare for us, but it's fantastic for the students. And that's, that is, that is very rare, and the studios frequently comment on that inter-disciplinary program and how it's set up, and how beneficial it is to the students.

When asked how the faculty managed to keep good communication, Geoff referred to methods as used by students, which led to elements of group flow:

Dave hired me, but he already knew me because I was one of his former students. And when I was out in industry, he would come visit me at the studios. So part of it is that we're all fairly friendly, we like hanging out together, because it takes a lot of time and a lot of work. And because of that, that enjoying being around each other, facilitates good communication, and bottom line is it's that communication element, which is a challenge for us, because we're in three departments in two colleges. That's just the program, right? And then if you look at the new animation center, you add an entirely, one other college, in another department to that mix. And even before the center was created, we were already leveraging computer science, which isn't part of the program. But that's all based on personal relationships and the ability of the faculty to work together.

In this example, he explicitly mentioned how enjoying being around each other enabled communication, exemplifying the ways physical presence alone can facilitate group flow. This

suggests that group flow on a management level, as with faculty, may facilitate group flow on smaller levels, like student groups working in classrooms.

Environment. The professors enhanced the environment for group flow by teaching collaborative skills, championing student autonomy, and connecting students with industry.

Teaching collaborative skills. During interviews as well as during *Daily meetings*, the faculty members commonly reiterated the importance of learning to work with a group, especially because of how needed that skill was in industry. Students also talked about learning the skill of working in a group, and in interviews with three student leads, each of them mentioned learning how to take criticism or feedback from group members, or to learn to take someone else's idea and "plus" it, or improve it, even if your idea was not chosen. Students said they learned humility from the program, and said that allowed them to work better in a group.

I think it's a really good thing that the professors do when we're in our classes, and they really, they give us a lot of criticism . . . They tell us flat out if something's wrong. And at first, you're just like (widens eyes), kind of taken away by it, because you're just like (widens eyes again). It affects you a little bit, because you're not used to that. But it's a very needful part of the process of making a film, in order for everyone to work together. We have to fix our mistakes. Some people on the film end up leaving, because they're offended.

Two professors talked about the irony of teaching artists to work together in groups, because artists are so often encouraged to be creative individually to create their own art. Pete, a faculty member, mentioned the importance of teaching students to compromise.

By nature, artists like to work solo. Just because, as an artist, you have a creative vision for something, for an idea, or a concept. And so, most artists will sit down at their desks, you know, create that vision, and they get to make all the decisions pertaining to their artwork. When you sit down in a collaborative environment, you have to work with somebody else who also has a creative vision. And maybe 20 people that have a creative vision. So they have to learn to sit in a group together and discuss, do we make the guy's hair blue, or do we make the guy's hair green. And there will be very strong personalities and artistic opinions and arguments for both sides. And so, they have to learn how to compromise, because that's exactly what you do in the business. When you go in the industry, you don't get to call the shots on everything. You get to support the shots that

are called, for the most part. And so, they have to learn that art of the compromise, or they're gonna go in the industry and they're just, they're gonna go in with a little bit of a haughty attitude and it's gonna get shut down pretty fast.

One professor noted that one of the important skills that group members had to learn was differentiating between when to share their ideas, and when to keep quiet. He shared examples of two students, one who had lots of good ideas but didn't know when or how to share them, and another student who didn't accept anyone else's ideas because he was the only one who knew how to do it "right." The professor provided two extreme examples of imbalance of this tension between speaking up versus listening and accepting others' ideas, or being flexible, and how both extremes eventually led to challenges in becoming employable. Sawyer (2007) addressed both of these skills in his explanation of "close listening" and "moving it forward," though they are articulated generally, thus these examples provide valuable insight into their meanings.

Similarly, Dave, the Program Director, talked about the importance of teaching students to compromise, especially among students with such diverse emphases:

This group project is for one, highly interdisciplinary. We make sure that we get students from lots of other places on campus. So there are communications students oft times, there are film students oft times, always computer science majors, oft times some kind of visual arts students, illustration or somebody else on it, the animation students. We want them to understand, there's a lot of people they're going to be working with for the next 30 years that have a completely different interest and passion, experience, and ability. It doesn't mean that your passion is better than their passion, it's just different. And in order to pull this off, you've got to have huge mutual respect for each other. . . . In order to be a successful marriage or anything, you've got to learn how to compromise. You've gotta learn when that another person's opinion may be different but equally good, you don't need to "win" every time.

But both professors mentioned that learning to compromise was one of the skills that made these students sought after by the industry, because students don't often have to learn to compromise before getting a job, where compromise is commonplace.

Championing student autonomy and choice. Many of the students talked about the faculty giving them ownership/autonomy, and explained what that meant for them. Ian, the lighting lead, described the professors' roles from his perspective: "Their involvement is pretty. . . they're there, but they try not to be. . . They try to let us do most of the work ourselves, but at the same time, making sure we don't derail ourselves too badly." They said working with faculty, the faculty steered them away from cliché solutions, pushing them to be more original. While the professors did try to participate actively in the project, they tried to give students the room to make it their own. Each of the students interviewed mentioned the same phenomenon, acknowledging that faculty members tried to give students the autonomy to run the production themselves, acting as mentors rather than managers.

While most ideas given by faculty were provided as suggestions, there was one issue on which faculty members were consistently insistent, and that was that no student lead was to take away a student assignment and give it to another student without consulting the professors first. In the production environment of the student film, there were often timelines that needed to be met, and sometimes students did not do what asked of them in the time frame expected, and sometimes student leads would threaten to take that assignment away from them. The professors spoke up every time that was mentioned to remind student leads not to take away a student's assignment unless they had consulted with the professor first, for two reasons: First, to avoid hurt feelings or burned bridges between students, and second, to protect each student's opportunity to use the work in their portfolios to get a job. In this way, the professors protected the student's individual assignments, not allowing student leads to take them away from the students. Brian mentioned this was one of the biggest challenges because that meant they sometimes had to let students fail.

If someone isn't meeting their deadlines, we can't take away their assignment. Not only is it their assignment, but it's also for class. (Shrugs) I don't have, (laughs) I can't pass or fail anyone. I'm not the teacher. I'm just a fellow student. . . . In talking with a faculty member, I can keep them as informed as possible, but the truth of the matter is, you have to let that individual fail. They have to kind of meet the requirements of failure on their own, which again is doubly frustrating, because not only are they failing, which hurts the individual and is sad to see, but it also slows down the film.

In this example, Brian demonstrated how faculty members were the only ones with the authority to take an assignment away from a student, and how that affected the group, to the point of individual and collective delays and even failure, allowing the students to learn about failure on their own. This was challenging for the students, but good for them also, forcing them to learn to work together and even fail together at times.

Connecting students with industry. In addition to collaboration within the university faculty and staff, faculty members also initiated collaboration with the industry to find out what skills the industry needed and how to prepare their students to fulfill those needs. Dave talked about what they did to stay in touch with the industry, and how they allowed the industry needs to define an ever-changing curriculum. He said he personally writes to the leaders of major studios, asking them what to include in a course on lighting, for example.

So, I need to start this class in lighting, what are the skills that a lighter's going to need three years from now, or four years from now? What are the skills? . . . But I'm not going to just create a course to get people fed into [a particular major studio], because they're only going to hire one or two. So I've got to talk to lots of studios about how they do lighting, what are the lighting skills? Games, movies, visual effects companies. Then I'll try and coalesce a bunch of those things into a 3-and-a-half-month semester experience that a student can take and hopefully get a skill that, enough of a skill that each of those different disciplines will look at it and go, it's not exactly what I was looking for, but it's close enough that we'll hire them for that skill. But we're always, always asking the studios, we're always spending time.

Even with an industry-based curriculum, students still may have felt disconnected with the industry. However, the director of the program invited several industry professionals to visit the studio regularly, to give feedback on the film and to share their experiences. At the same time,

this provided industry professionals the opportunity to see the students in action in a group environment, allowing them to recruit students for their studios as well.

In an interview with Dave, he talked about how he felt like the visitors helped drive home what he was trying to teach them all the time about what they have to do to be employable; that the students would listen to the visitor when they wouldn't listen to him anymore because he seemed to be repeating himself:

The students will listen to me, but at one point it's like, it's like their mom or dad you know, just pounding on them all the time (smiles). So any time I get a former student or somebody out in the industry to come and talk to the students, then they realize that what I'm saying, I'm just saying it because that's what I've heard studios tell me all the time. I'm not trying to mold them into something different just because it's my interest. So when Bob comes in and says, you know, we need artists that can also do technical stuff. They've heard it a million times, but now they'll listen.

The visitors drove home the end vision of what they're trying to accomplish—completing a short film and getting jobs. The students listened to them because they had a context for immediate application of the advice they offered. The idea of outside influences contributing to group flow is not found in Sawyer's theory, though I think it is supportive of the encouragement and training from the professors on specific things students need to do to reach their real goals of getting good jobs.

Preparing students to apply for and obtain employment in studios may have helped motivate students to work harder, being able to trust that by working on the tasks given them, they were preparing adequately for the field. Increased focus towards this end goal may have enhanced group flow in the studio.

Conclusions

The findings from this study suggest that student leads and professors facilitated elements of group flow through task selection, group member selection, and a supportive environment. However, student leads and professors were found to have different roles regarding facilitating

these aspects of group flow. This may suggest the value of having student leaders in addition to professors within the classroom or studio setting.

Student leads primarily used methods of task selection and a supportive environment to facilitate the elements of group flow. In this context, the student leads were primarily responsible for coming up with the original plan for the project, which designated the tasks that the group members would be required to complete, such as the original story or the number of characters and environments. However, this also involved structuring the project for student initiative, for example, by allowing fellow students to volunteer for the tasks they worked on and creating a culture of communication within the group.

Professors also used a supportive environment to facilitate group flow. Professors were active participants in the process, though students felt professors were participating at a very high-level, despite often having a hands-off approach to fostering student independence. Professors taught the skills that would help students be employable, connecting the students with their personal goals to get hired and have good jobs they enjoyed.

Professors also facilitated group flow through group member selection, not by being elite or selective, but by creating opportunities for students to work together across departments to complete the film. In addition, professors gave better context to tasks for task selection by mentoring students through the tasks at hand and also connecting students with mentors in the industry who had faced similar challenges.

The findings from this study suggest that professors and student leads have different roles in fostering group flow. Student leaders can encourage group flow by providing vision, isolating work tasks, listening to and incorporating feedback, and fostering friendship and communication among group members. Professors can facilitate group flow through defending student

autonomy and choice, teaching collaborative skills, collaborating between college departments, bringing awareness to project bottlenecks, and connecting students to the industry.

While the literature often discusses task selection and group member selection as something that happens at the beginning of the project, these were elements that were characterized in this context by being organic, changing elements of the group, dependent on all group members, including student leads and professors. The vision changed over time as group members included their ideas, and the collaboration between group members and departments waxed and waned on a needs-basis. As with the elements of group flow, it was rare to observe all of these methods happening concurrently. Sometimes the student leads took more control over the project, and sometimes the professors had to step in and help the processes along.

Limitations

This study utilized informal interviews captured on video of participants discussing their group experiences, not necessarily group flow specifically. In addition, the video data collected was designed to capture the day-to-day normal activities of the group and their collaborative work, and was not designed to capture group flow situations specifically. While this provides a more authentic set of data, responses may have been different if they had been more specific to certain elements of group flow. It is also difficult to generalize from this case study of one cohort in one higher education setting to other contexts.

Future Research

Additional research could be done to better understand the different roles that professors and student leads play in facilitating group flow. Further research is also needed to understand how student leads and professors can facilitate each of the elements of group flow individually instead of collectively. Also, more research is needed to observe whether focusing on certain

elements of flow can cause an imbalance of flow elements, leading to less experiences of group flow within the group.

References

- Albanese, M. A., & Mitchell, S. (1993). Problem-based learning: A review of literature on its outcomes and implementation issues. *Academic Medicine, 68*(1), 52–81.
- Amabile, T. M., & Fisher, C. M. (2000). Stimulate creativity by fueling passion. *Handbook of principle of organizational behavior* (2nd ed.). Sussex, UK: John Wiley & Sons Ltd.
- Ankrah, S., & Omar, A.-T. (2015). Universities–industry collaboration: A systematic review. *Scandinavian Journal of Management, 31*(3), 387–408.
- Armstrong, A. C. (2008). The fragility of group flow: The experiences of two small groups in a middle school mathematics classroom. *The Journal of Mathematical Behavior, 27*(2), 101–115. <http://doi.org/10.1016/j.jmathb.2008.08.001>
- Author (unpublished). Conceptualizing group flow: A framework for future research.
- Author (2012). Inside the black box: revealing the process in applying a grounded theory analysis. *The Qualitative Report, 17*, 1–23.
- Baker, F. A., & MacDonald, R. A. R. (2013). Flow, identity, achievement, satisfaction and ownership during therapeutic songwriting experiences with university students and retirees. *Musicae Scientiae, 17*(2), 131–146. <http://doi.org/10.1177/1029864913476287>
- Bantel, K. A., & Jackson, S. E. (1989). Top management and innovations in banking: Does the composition of the top team make a difference? *Strategic Management Journal, 10*(S1), 107–124. <http://doi.org/10.1002/smj.4250100709>
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*(2), 77–101.
- Bryan-Kinns, N., & Hamilton, F. (2012). Identifying mutual engagement. *Behaviour & Information Technology, 31*(2), 101–125. <http://doi.org/10.1080/01449290903377103>

- Cole, D. G., Sugioka, H. L., & Yamagata-Lynch, L. C. (1999). Supportive classroom environments for creativity in higher education. *The Journal of Creative Behavior*, 33(4), 277–293. <http://doi.org/10.1002/j.2162-6057.1999.tb01407.x>
- Csikszentmihályi, M. (1975). *Beyond boredom and anxiety*. San Francisco, CA: Jossey-Bass.
- Csikszentmihályi, M. (2008). *Flow*. New York, NY: Harper Collins Publishers.
- Deci, E. L., & Ryan, R. M. (2002). *Handbook of self-determination research*. Rochester, NY: University Rochester Press.
- Deci, E. L., & Ryan, R. M. (2008). Self-determination theory: A macrotheory of human motivation, development, and health. *Canadian Psychology/Psychologie Canadienne*, 49(3), 182.
- Fullagar, C. J., & Kelloway, E. K. (2009). Flow at work: An experience sampling approach. *Journal of Occupational and Organizational Psychology*, 82(3), 595–615. <http://doi.org/10.1348/096317908X357903>
- Gottschall, H., & García-Bayonas, M. (2008). Student attitudes towards group work among undergraduates in business administration, education and mathematics. *Educational Research Quarterly*, 32(1), 3–28.
- Guzzo, R. A., & Shea, G. P. (1992). Group performance and intergroup relations in organizations. *Handbook of industrial and organizational psychology*, 3, 269–313.
- Haring-Smith, T. (2006). Creativity research review: Some lessons for higher education. *Peer Review*, 8(2), 23–27.
- Hackman, J. R. (1987). The design of work teams. In J. W. Lorsch, *Handbook of organizational behavior* (pp. 315–342). Englewood Cliffs, NJ: Prentice-Hall.
- Hatch, J. A. (2002). *Doing qualitative research in education settings*. Albany, NY: SUNY Press.

- Hirst, G., Knippenberg, D. V., & Zhou, J. (2009). A cross-level perspective on employee creativity: Goal orientation, team learning behavior, and individual creativity. *Academy of Management Journal*, 52(2), 280–293. <http://doi.org/10.5465/AMJ.2009.37308035>
- Jang, H., Reeve, J., & Deci, E. L. (2010). Engaging students in learning activities: It is not autonomy support or structure but autonomy support and structure. *Journal of Educational Psychology*, 102(3), 588–600. doi:10.1037/a0019682
- Karau, S. J., & Williams, K. D. (1993). Social loafing: A meta-analytic review and theoretical integration. *Journal of Personality and Social Psychology*, 65(4), 681–706. <http://doi.org/10.1037/0022-3514.65.4.681>
- Merriam, S. B. (1998). *Qualitative research and case study applications in education* (Second edition). San Francisco, CA: Jossey-Bass Publishers.
- Miranda, S. M., & Saunders, C. (1995). Group support systems: An organization development intervention to combat groupthink. *Public Administration Quarterly*, 19(2), 193–216.
- Murnighan, J. K., & Conlon, D. E. (1991). The dynamics of intense work groups: A study of British string quartets. *Administrative Science Quarterly*, 36(2), 165–186. <http://doi.org/10.2307/2393352>
- Pelled, L. H., Eisenhardt, K. M., & Xin, K. R. (1999). Exploring the black box: An analysis of work group diversity, conflict, and performance. *Administrative Science Quarterly*, 44(1), 1–28.
- Reeve, J. (2006). Teachers as facilitators: What autonomy-supportive teachers do and why their students benefit. *The Elementary School Journal*, 106(3), 225–236. <http://doi.org/10.1086/501484>

- Reeve, J., Deci, Edward L., & Ryan, R. M. (2004). Self-determination theory: A dialectical framework for understanding sociocultural influences on student motivation. In D. M. McInerney & S. Van Etten (Eds.), *Big theories revisited* (pp. 31–49). Greenwich, CT: Information Age Publishing.
- Reeve, J., & Jang, H. (2006). What professors say and do to support students' autonomy during a learning activity. *Journal of Educational Psychology, 98*(1), 209–218. doi:10.1037/0022-0663.98.1.209
- Sawyer, R. K. (2003). *Group creativity: Music, theater, collaboration*. Mahwah, NJ: Lawrence Erlbaum Associates, Inc.
- Sawyer, R. K. (2006). Group creativity: Musical performance and collaboration. *Psychology of Music, 34*(2), 148–165.
- Sawyer, K. (2007). *Group genius: The creative power of collaboration*. New York, NY: Basic Books.
- Strauss, A., & Corbin, J. (1990). *Basics of qualitative research* (Vol. 15). Newbury Park, CA: Sage.
- Van Knippenberg, D., & Schippers, M. C. (2007). Work group diversity. *Annual Review of Psychology, 58*(1), 515–541. <http://doi.org/10.1146/annurev.psych.58.110405.085546>
- Vollmeyer, R., & Rheinberg, F. (2006). Motivational effects on self-regulated learning with different tasks. *Educational Psychology Review, 18*(3), 239–253. <http://doi.org/10.1007/s10648-006-9017-0>
- Walters, J. (2005). Fostering a culture of deep inquiry and listening. *Journal for Quality & Participation, 28*(2), 4–7.

- Watson, W. E., Kumar, K., & Michaelsen, L. K. (1993). Cultural diversity's impact on interaction process and performance: Comparing homogeneous and diverse task groups. *Academy of Management Journal*, 36(3), 590–602. <http://doi.org/10.2307/256593>
- Weick, K. E., & Roberts, K. H. (1993). Collective mind in organizations: Heedful interrelating on flight decks. *Administrative Science Quarterly*, 38(3), 357–381.
- Weldon, E., & Weingart, L. R. (1993). Group goals and group performance. *British Journal of Social Psychology*, 32(4), 307–334. <http://doi.org/10.1111/j.2044-8309.1993.tb01003.x>
- Wilson, B. G. (1996). *Constructivist learning environments: Case studies in instructional design*. Englewood Cliffs, NJ: Educational Technology.
- Zhou, J. (1998). Feedback valence, feedback style, task autonomy, and achievement orientation: Interactive effects on creative performance. *Journal of Applied Psychology*, 83(2), 261–276. <http://doi.org/10.1037/0021-9010.83.2.261>

DISSERTATION CONCLUSION

The BYU Animation Studio was a fruitful setting for observing elements of group flow and how teachers and student leads can facilitate group flow in a higher education project setting. Article 2 built on the findings of Article 1, by considering the role of instructor and student leaders in facilitating group flow.

In Article 1, we were able to learn more about the experiences of the elements of group flow within a group setting in higher education. Not all of the elements of group flow were always present, but often there were evidences of one or more elements. Vision was manifest through both project-oriented and people-oriented goals, and the challenging project selected by the students. Ownership and contribution was evidenced through student initiative in problem-solving and working through personal conflicts with group decisions, while making efforts to share knowledge with other group members. Group members exhibited elements of communication in the quantity of communication as well as by the quality of communication, including validation of other group members, building off each others' ideas, and putting the interests of the group above personal interests.

In Article 2, we delved into the data looking for specific ways professors and student leads facilitated group flow within the group. So far as we did find elements of group flow within the data, we also found evidences of the different ways that professors and student leads enhanced group flow through task selection, group member selection, and a supportive environment. While these findings were consistent with the literature, the specific examples provide additional insight into how each of those factors can influence group flow. Student leads were instrumental in creating a supportive environment by structuring the project for student initiative and fostering friendship and communication among group members. Professors

facilitated a supportive environment through teaching collaboration skills, championing student autonomy, and connecting students with industry. Professors also influenced group member selection by providing opportunities for collaborating with students from other departments while practicing collaboration between faculty members.

Evolution of Method

As the study progressed, we made several changes to the research methodology based on emerging findings from the study, per standard qualitative procedure, which focuses on the evolutionary nature of research (Strauss & Corbin, 1990). While analyzing data for Article 1, we revised the wording of my official research questions, with approval from my committee, from the following three questions:

1. What elements of group flow, as articulated by Sawyer, are present in this educational setting?
2. Is there evidence for any other factors, actions, or group traits that also contribute to the state of group flow?
3. Do these elements of group flow seem to facilitate greater group creativity or productivity? If so, how?

To the simplified question:

How do students in a higher education animation studio experience vision, ownership/contribution, and communication through their group design experience?

This revision enabled me to more easily discuss the elements of group flow within the overarching themes. I did this because many of the elements overlapped with each other, such as close listening and blending egos, and consolidating the 10 elements of group flow to three main

themes simplified the study for greater understanding by the reader. In addition, there was not sufficient evidence to answer questions 2 and 3 at this time.

In addition to the change in research questions, we also changed the methodology from case study, where we planned to analyze only selected events, to a more general qualitative study. Watching the video clips, it was exciting how many examples of the elements of group flow there were, and we attribute that to the people-oriented goal that this group had of striving for a positive group experience. However, it was difficult to identify one instance where all of the elements of flow were definitely present, in part because of the overlapping nature of some of the elements. Using all of the data instead of specific segments allowed me to convey the best of the breadth of examples instead of going into greater depth on specific examples in this study, and this tradeoff seemed to provide the most important method for sharing insights in my article.

Because of the breadth of examples and article space restrictions, not all findings are included in this article. For example, in addition to the findings in the article, there were several examples of the group flow element of familiarity, both between group members and with foundational knowledge. These examples were excluded in part because they did not easily fit in with the original overarching theme of ownership and contribution, and also because many of these examples included elements of communication, which were already included in the article.

Similarly, Article 2 was also going to be a case study, and the methodology for that was also changed to a more general qualitative study using all of the data instead of specific segments. Overall, there were several examples of the elements of group flow, including specific goals, blending egos, close listening, and moving the project forward. Both professors and student leads played important roles in facilitating group flow. Inter-departmental collaboration enhanced the potential for group flow.

These findings suggest that elements of group flow do accompany and adequately describe the processes of creative, collaborative groups. For the context of higher-education, these findings could have several implications. First, having a student-elected class or group leader for a classroom could improve the vision for that specific group, as well as the communication between group members. Second, students may achieve group flow in group projects that are voluntary, long-term, and authentic to industry. Third, this study supports the idea that faculty members can work across departments to enhance group flow by providing opportunities for students to work across departments, increasing the possibility of coming up with creative, innovative solutions. Fourth, students in a university level may need explicit instruction regarding collaborative skills to establish expectations for the group experience in each specific project. Finally, focusing on the elements of group flow within the group settings could lead to more efficient and more creative group solutions that could prepare students for group work in industry.

Future Research and Lingering Questions

The video footage had some very compelling examples of elements of group flow, but because the video footage was taken predominantly during the first part of the project, it leaves the researcher curious as to how some elements may have become more or less important during the ending phase of the project. Sawyer (2007) talked about the difference between a problem-finding creative task and a problem-solving creative task. During the beginning phase of the project, there was more experimenting and brainstorming, thus the examples of the elements of group flow may have been different had we had more footage of the end phase of the project, “finish mode,” when students were primarily developing and completing the ideas that had already been created. It could be that both problem-finding and problem-solving tasks were

present through the timeline of this senior project. Also, because the data for this project was collected about five years ago, it was not feasible to find each student to verify events that happened during the project, to ask for their specific perspectives, whether or not they were really experiencing the elements of group flow.

Using group flow to describe other group projects could also provide further insight into the synergistic processes of other group work environments. However, more research is needed to understand how students experience group flow along the lifespan of the project. Also, more research is needed to know whether or not individual flow is a good predictor of group flow, or whether they can separately exist.

In addition, this research implies several implications for professors, suggesting the need to have student leaders within the class to instigate better group vision and communication. Also, this research promotes collaboration between college departments to create more useful and creative products, beginning with collaboration, and perhaps even group flow, between faculty members and industry experts.

DISSERTATION REFERENCES

- Bennis, W. G., & Biederman, P. W. (1997). *Organizing genius*. Cambridge, MA: Perseus Books.
- Csikszentmihályi, M. (1996). *Creativity: Flow and the psychology of discovery and invention*. New York, NY: Harper Collins Publishers.
- Guilford, J. P. (1950). Creativity. *American Psychologist*, 5(9), 444–454.
- Haring-Smith, T. (2006). Creativity research review: Some lessons for higher education. *Peer Review*, 8(2), 23–27.
- John-Steiner, V. (2000). *Creative collaboration*. Oxford, NY: Oxford University Press.
- Linder, J. C., Jarvenpaa, S. L., & Davenport, T. H. (2003). Toward an innovation sourcing strategy. *MIT Sloan Management Review*, 44(4), 43–49.
- Montuori, A., & Purser, R. E. (1999). Social creativity: Introduction. In A. Montuori & R. E. Purser (Eds.), *Social creativity* (Vol. 1, pp. 1–45). Cresskill, NJ: Hampton Press.
- Paulus, P. B., & Nijstad, B. A. (2003). Group creativity: Common themes and future directions. In P.B. Paulus & A. B. Nijstad (Eds.), *Group creativity: Innovation through collaboration* (pp. 326–339). Oxford, NY: Oxford University Press.
- Sawyer, K. (2007). *Group genius: The creative power of collaboration*. New York, NY: Basic Books.
- Sawyer, R. K. (2011). *Explaining creativity: The science of human innovation*. Oxford, NY: Oxford University Press.
- Sawyer, K. R., & DeZutter, S. (2009). Distributed creativity: How collective creations emerge from collaboration. *Psychology of Aesthetics, Creativity, and the Arts*, 3(2), 81–92.
<http://doi.org/10.1037/a0013282>

Sheldon, K. M. (1995). Creativity and self-determination in personality. *Creativity Research Journal*, 8(1), 25-36.

Strauss, A., & Corbin, J. (1990). *Basics of qualitative research: Grounded theory procedures and techniques*. Newbury Park, CA: Sage Publications, Inc.