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Conceptualizing group flow: A framework

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This literature review discusses the similarities in main themes between Csikszentmihályi theory of individual flow and Sawyer theory of group flow, and compares Sawyer's theory with existing concepts in the literature on group work both in education and business. Because much creativity and innovation occurs within groups, understanding group collaboration characteristics, including group flow, is critical to designing, leading, and sustaining effectively creative groups. Sawyer's theory, being the first to describe flow within groups, can be difficult to conceptualize because of the high number of included constructs. 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, as well as improved practice in developing and leading innovative groups.

Key words: 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 et al., 1996; Csikszentmihályi, 1990; Hetland et al., 2007; Runco, 2007), suggesting a strong connection between individual flow and creativity.

More recently, researchers have continued to find evidence for the value of a flow-like state of engagement in everything from fiction writing (Paton, 2012), video games and transmedia (Velikovsky, 2014), and music education (Custodero, 2012). Hamari et al. (2016) considered the effectiveness of two educational games

through the lens of flow theory, and found that this deep engagement in the game derived from flow clearly improved learning, in particular the challenge aspect of the game, since an appropriate level of challenges is key to flow. Yan et al. (2013) studied knowledge seeking and knowledge contributing behaviors within online virtual communities and found both to lead to a higher state of flow. Moneta (2012) also found in a study of 367 workers from a variety of fields that flow was best achieved when there was a good match between an individual with intrinsic motivation and an environment providing opportunities for creativity.

However, while research has continued on flow and its connection to creativity, scholarship on what flow might look like for group/collaborative environments are nearly

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non-existent. 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 et al., 2009). However, group flow has not been researched extensively in either of these areas. 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.

METHODOLOGY

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. We begin this review discussing Csikszentmihályi's works on individual flow as a foundation for understanding group flow. Then in considering group flow we review Sawyer's works on group flow; other sources that cite his work; and sources from search results in Google Scholar, ERIC, and PsychINFO, and Business Source Premier. The study strategy for collecting sources involved multiple steps. First, we searched major databases such as Google Scholar and Education Resources Information Center (ERIC), primarily for articles containing phrases such as *group flow* and *groups and creativity*. However, we also included results from other searches using the following words and phrases: *group unity*, *collaboration*, *listening*, *creativity*, *innovation*, *group problem solving*, *group work*, and *teams*. From this pool of articles, we retained those that referenced *group flow* outright, or that appeared to be discussing a similar concept. Second, we were already familiar with Sawyer's work in group flow, so we reviewed his writing extensively, as well as those who cited his group flow theory. In addition, we primarily considered articles that applied these ideas to the contexts of higher education and/or business group creativity.

Individual flow

While individual flow is not the main focus of this paper, some review of the original theory is warranted. 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,

1990). While this phenomenon was originally studied in leisure activities (Csikszentmihályi, 1975), studies have expanded to include a wide range of activities, including, but not limited to, research in education (Hamari et al., 2016; Egbert, 2004; Shernoff et al, 2003), work-related activities (Eisenberger et al., 2005; Fullagar and Della Fave, 2017; Fullagar and Kelloway, 2009; Ghani and Deshpande, 1994; Moneta, 2012; Salanova et al., 2006; Yan et al., 2013), and technology-facilitated environments such as video games, social media, and online learning (Peppler and Solomou, 2011; Velikovskiy, 2014; Hamari et al., 2016).

Recent discussions in flow theory discuss the relationship between flow and the individual, such as how flow may contribute to an individual's self-identity and their perception of the world (Fave Delle and Bassi, 2016). Massimini and Della Fave (2000) explored how individuals play active roles in selecting the values and preferences that shape their experiences, and how that process frames a person's flow experiences. Other contributions look more closely at the effects of flow, including intrinsic motivation in high opportunities for creativity (Moneta, 2012), associated creativity (Custodero, 2012), and even resulting dependence on flow activities (Partington et al., 2009). In addition, advances have been made through improvements in the measurement of flow (Jackson and Eklund, 2002; Moneta, 2012b).

The results of the research on flow suggest that not only are people happier when they were engaged in flow activities, and not only do 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 et al., 2013; Runco, 2004; Vollmeyer and Rheinberg, 2006). Besides increased creativity, individual flow is said to have a number of positive effects, including motivation for learning (Vollmeyer and Rheinberg, 2006), production of meaningful artifacts and an increased sense of satisfaction, achievement, ownership, sense of self and identity (Baker and MacDonald, 2013), and improved mood (Fullagar and Kelloway, 2009).

After collecting a variety of data on flow experiences in many contexts, Csikszentmihályi (1990) found five specific conditions make an activity more prone to flow: 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 and 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 et al., 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). More recently, Custodero (2012) noted that “having clear goals is a characteristic of flow experience” (p. 372). As long as the rules are respected, a flow situation is a social system with no deviance (Csikszentmihályi and 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. Providing clear goals can actually enhance, instead of restrict, creativity (Aleksić et al., 2016).

Intense concentration

Possibly as a result of minimal distractions, subjects in flow in Csikszentmihályi (1990) 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 is in this condition of self-forgetting that professional artists can create, organize, and organize their work (Chemi, 2016).

Sense of control

Csikszentmihályi (1975) noticed that flow experiences seemed to have an overall theme of a sense of control of actions and environment. He suggested that flow depends partially on environment and structure, and also on the individual’s ability to restructure the environment—his or her surroundings for flow to occur. In addition, in his interviews Csikszentmihályi (1975) observed that flow occurs when people can cope with all the demands for action when the dangers are predictable and manageable. In Bakker (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. In contrast, boredom has been associated with reduced agency (Raffaelli et al., 2017).

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 for them to be motivated to continue pursuing the activity. In addition, many flow activities have opportunities for action-varying levels of difficulty and engagement. Some researchers have suggested that the need for a perceived balance of challenge and skill may be dependent on other conditions, if necessary at all (Løvoll and Vittersø, 2014). 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 and 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 individual flow is clear feedback (Custodero, 2012). 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, individuals exhibited less creativity when they received negative feedback in a controlling style, rather than positive feedback in an informational style (Zhou, 1998). Feedback in flow theory can also apply 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. Recent research has been done to explore various methods of feedback, including sketching (Cseh et al., 2016) and technology-facilitated feedback (Muis et al., 2015).

Summary of conditions for 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 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 and Deshpande, 1994).

Group flow

Today in the workplace, people more often work in groups than alone (Hirst et al., 2009), and people generally acknowledge that groups can be more creative than individuals (Paulus et al., 1995). Many breakthrough innovations are a result of group creativity (Bennis and Biederman, 1997; Sawyer, 2007), or seen as a result of sociocognitive interaction (Glăveanu, 2011).

However it is also known that putting people in groups alone does not lead to success (Paulus et al., 1993), and “collaboration” can become more of a buzzword than an effective strategy (Bedwell et al., 2012). A few researchers have attempted to articulate the optimal group experience by applying principles of individual flow to groups, including the ideas of “social flow” (Walker, 2010), “collective flow” (Salanova et al., 2014), and “networked flow” (Gaggioli et al., 2011; Triberti et al., 2016). Some have even tried to measure similar phenomena through increased heart rates (Noy et al., 2015), longitudinal social signals (Gloor et al., 2014), and sociometric sensors (Hong et al., 2014).

To address these social dimensions, 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”. While conditions for group flow are derived from the conditions of individual flow, group flow is “a property of the group as a collective unit” (Sawyer, 2006).

To try to define the phenomenon of group flow, Sawyer (2007) revised Csikszentmihályi (1990) 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, and discussing Sawyer’s 10 principles as sub-sections within the three main categories of vision, ownership and contribution, and communication.

Vision

In research concerning group creativity, creative collaboration requires some explicit preparation. There is often a concept of a vision, a goal, or a task at hand. In Sawyer (2007) discussion of a vision for group flow, he suggested that group flow occurs when there is a specific goal in mind and 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 and Shea, 1992; Pritchard et al., 1988; Weldon and Weingart, 1993), and have researched the importance of group commitment to those goals (Aubé et al., 2014; Latham and Yukl, 1975; Locke, 1968; Maier, 1963; Vroom and 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).

In his explanation of group goals, Sawyer (2003) differentiated between unstructured and task-oriented groups. For example, with jazz improve or theaters improve, 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”. 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". On the other hand, "in improv, the only goals are intrinsic to the performance itself-to perform well and to entertain the audience" (Sawyer, 2003).

Sawyer (2003) suggested that different types of tasks require different types of goals. 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 (Nokes-Malach et al., 2012; Steiner, 1978), and thus when selecting a group's goal or purpose, it is important to have one that challenges the group.

Kavadia and Sommer (2009) found that brainstorming solutions in a group, as opposed to working independently to find solutions, produces better solutions in cross-functional problems in which the group maximizes the diversity of its participants. For group flow, Sawyer (2007) believed there should be a goal, but it should be a goal with flexibility and balance between 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.

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". However, Sawyer (2007) made a distinction that it is not the failure itself that leads to flow, but the potential for failure and the authenticity of the task at hand. 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).

Sawyer (2007) 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 and Mitchell, 1993).

This is not to say group flow requires stress. 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 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.

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 owning and contributing themselves to the team goal. One model of social flow (Thimot, 2016) explained this concept as self-trust, a pre-cursor and requirement for inter-personal trust, which enables the conditions of high-performing teams and the willingness to lose one's sense of self. Thus, the second key principle of group flow is group ownership and contribution, which arises from three of Sawyer (2007) 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

Autonomy and achievement have gone hand-in-hand in studies in education (Jang et al., 2010; Roth et al., 2007; van Loon et al., 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" (Cohen et al., 2017). But Sawyer (2007) definition of control also included 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.

Although Sawyer (2007) 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 et al., 1982; Flink et al., 1990; Reeve and Jang, 2006; Reeve et al., 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 and 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

According to Sawyer (2007), 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 does not think anything can be learned from the conversation.

For example, Sawyer (2007) believed 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). By listening to and implementing 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. These ideas are supported by one study of teams, in which members in good teams were found to speak in roughly the same proportion (Woolley et al., 2010).

Familiarity with group members

Sawyer (2003) suggested that when group members are familiar with each other, they know the performance styles of "teammates" and "opponents". 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 et al., 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. 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 and Roberts, 1993). Sawyer (2007) 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).

Groupthink research suggests that because group members are familiar with each other, they will sometimes seek "unanimity and consensus rather than careful analysis of options" (Miranda and Saunders, 1995). In addition, prior experience can sometimes cause group members to fixate on the incorrect path (Duncker, 1926). Sawyer (2007) 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). In the theory of networked flow (Gaggioli et al.,

2011), individuals find flow in groups by forming sub-groups of individuals with similarities and shared intentions, supporting the importance of familiarity with other group members.

Familiarity with guiding principles

Another important type of familiarity is with guiding principles, a “common language and a set of unspoken understandings, or tacit knowledge” (Sawyer, 2007). Sawyer (2003) suggested that group flow is a function of goals and the number of “pre-existing structures shared and used” by group members. The pre-existing structures of a group are the basic rules and actions associated with a certain type of task, including:

- (1) An overall flow or outline of the task that all participants know in advance.
- (2) A shared repertoire of processes and a knowledge of how they sequence in order, and
- (3) A shared repertoire of conventions and terms (Sawyer, 2003, 2007).

This principle echoes the results found in a study done by Chang et al. (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. Similarly, in a study of pilots with varying levels, it was shown that expertise was associated with collaborative gains (Nokes-Malach et al., 2012). These studies suggest 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, group flow requires communication, particularly improvisational communication such as spontaneous conversations in the hallway or in social meetings after work or lunch. Group discussion does not always lead to new ideas or an elaborated understanding (Eteläpelto and Lahti, 2008), and group members may vary over time on how central they are to the project, in responsiveness, and in amount of communication (Gloor et al., 2014). The constant communication in group flow is a combination of complete concentration, close listening, blending egos and moving the project forward.

Close listening

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) 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). Another finding from the study by Woolley et al. (2010) was that good teams had high average social sensitivity, meaning that they were skilled at knowing how others felt based on nonverbal cues. In a study of creativity at work, the most creative staff members were less central in the full corporate network, but were more responsive and responded to, which could be signs of characteristics of compassion and respect (Gloor et al., 2016). 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”.

Complete concentration

As seen in Csikszentmihályi’s model of individual flow, Sawyer (2007) 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”.

Armstrong (2005) 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). Thus, complete concentration in groups is not a solitary experience and can actually be observed. Thimot (2016) also observed that participants associated social flow

with high levels of concentration.

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).

Sawyer (2007) 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 invisible hands toward a peak, but small ideas build and an innovation emerges”. 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”. This group unity is a product, Sawyer (2007) 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 Wheal (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). According to Sawyer (2007), 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

We know from research that individual flow can be motivating (Sheehan and Katz, 2012), and can be associated with improved performance, creativity, and enjoyment (Jin, 2012). Research has also shown that

creativity may be amplified in group settings (Paulus et al., 2012).

However, there is very little research that describes what group flow might look like in collaborative settings. We believe that one possible reason for this may be that Sawyer (2007) 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 to move forward. To address these issues, in this paper we have attempted to synthesize Sawyer (2007) 10 conditions into three main categories. These three categories are also related to Csikszentmihályi (1990) original conception of individual flow (Table 1).

As represented in Table 1, 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, 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, having a shared sense of group efficacy (Salanova et al., 2014) 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. Many of the elements of group flow discussed in this paper are consistent with findings from literature (Gaggioli et al., 2011; Salanova et al., 2014), and researchers have found that group flow can produce even positive effects more frequently than individual flow (Walker, 2010). However, there has been little 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

Table 1. Comparison of conditions of flow versus group flow by theme

Theme	Flow (Csikszentmihályi, 1990)	Group flow (Sawyer, 2007)
Vision	Clear goals	Specific goal in mind
	-	Potential for failure
Ownership and Contribution	Sense of control	Being in control of actions and environment
	Concern for self disappears	Equal participation
	Task is comparable with skill level	Familiarity (with foundational principles)
	-	Familiarity (with others in the group)
Communication	Immediate feedback	Communication
	Concentration	Complete concentration
	Sense of time is altered	
	-	Close listening
	-	Blending egos
	-	Moving it forward

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

leaders can effectively enhance group flow within their groups for greater enjoyment, creativity and success.

CONFLICT OF INTERESTS

The author has not declared any conflict of interests.

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