

# Flow in Education

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## Glossary

**Flow** – A state of optimal experience characterized by total absorption in the task at hand; a merging of action and awareness in which the individual loses track of both time and self.

## Brief Definition and History

Nearly every educator holds the primary, though often elusive, goal of facilitating students' deep engagement in learning activities. In recent decades, Mihaly Csikszentmihalyi's flow model has advanced our understanding of the experience of deep engagement, as well as the individual and contextual factors that may promote it. The model has implications for both research and practice, and has seen application in fields, including education, psychology, psychiatry, anthropology, and business. This article provides a description and analysis of the flow model, and summarizes the potential and actual applications of flow in education.

Born out of a desire to understand intrinsically motivated activity, flow refers to a state of optimal experience characterized by total absorption in the task at hand; a merging of action and awareness in which the individual loses track of both time and self. The flow state is experientially positive, and out of the flow experience emerges a desire to replicate the experience. The concept of flow was developed nearly four decades ago by psychologist Mihaly Csikszentmihalyi while he was observing students at an elite art school in the United States. In an effort to understand what led individuals to be passionate about their creative pursuits, Csikszentmihalyi observed the students as they worked on their artistic creations. He quickly noted that students often became so engrossed in their work that they would effectively tune out any outside distractions or obligations. Students would lose track of time, missing meetings or mealtimes, working well into the night, apparently sustaining deep levels of both concentration and enjoyment for extended periods. Almost paradoxically, once the painting or sculpture was completed it seemed to lose its value to the student: The creation was often hauled back to a dark corner of the studio where it would sit indefinitely. It became clear that for these art students, the value in art was not to be found in the final product so

much as it was in the process of creating it: once the final brush stroke was applied students rarely took the time to admire their own creation, but instead were eager to get involved in a new project. Csikszentmihalyi came to characterize these experiences as autotelic, where the goal (telos) lies in participation itself (auto). In the nearly four decades that have elapsed since this initial discovery, Csikszentmihalyi and colleagues have studied the flow experience in multiple contexts, and have identified a shared phenomenology in that participants consistently describe optimal states of complete absorption, focus, and enjoyment (for reviews see Csikszentmihalyi, 1990; Nakamura and Csikszentmihalyi, 2002).

## The Flow Model and Its Use in the Study of Education

Studies of the flow experience have revealed consistency in the conditions under which these optimal states most often occur. Numerous researchers have confirmed commonalities both in optimal experiences and in their underlying conditions (Csikszentmihalyi, 1975/2000, 1990, 1996; Jackson, 1995, 1996; Massimini and Carli, 1988; Perry, 1999).

## The Flow Experience

The optimal state described by individuals is most commonly characterized by: (1) intense concentration on the task at hand; (2) a deep sense of involvement and merging of action and awareness; (3) a sense of control over one's actions in dealing with the task at hand; (4) enjoyment or interest in the activity; and (5) a distorted sense of time (usually that time has passed very quickly). During the process of gathering these descriptions, several interviewees described themselves as being in flow or flowing. Thus, experiences characterized by such descriptions have become known as flow experiences or flow states.

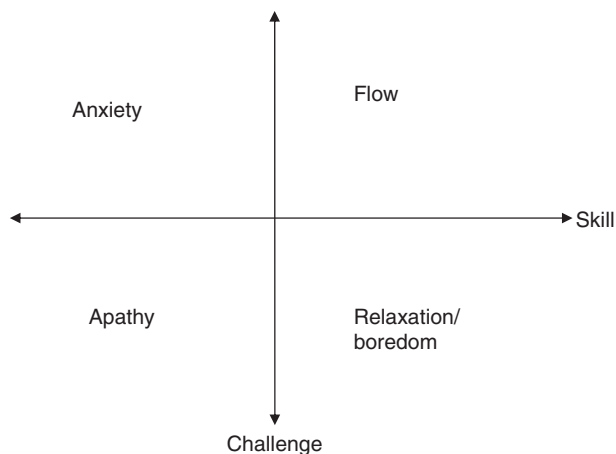
## The Flow Conditions

The specific activities from which individuals derive flow experiences vary widely. Interviews with males and females of different ages, classes, and cultural backgrounds have revealed that the flow state can emerge from involvement in a variety of activities, including athletics, performing surgery, tending cattle, haggling in the marketplace, working

on a factory line, reading, and writing. While there is considerable variation in the particular activities that lead people to experience flow, there are a number of phenomenological conditions that are typically present when flow does occur, regardless of the specific activity in which one is engaged. These conditions include: (1) engagement in activity chosen for its own sake – not a necessary, but a facilitative condition; (2) perceived challenges of the task at hand that are relatively high and in balance with one's perceived skills; (3) clear proximal goals that are regarded as important; (4) immediate feedback indicating one's success at meeting these goals; and (5) highly focused, rather than divided or scattered, attention.

Over the years, challenge and skill have emerged as two primary conditions for the flow experience: research has consistently shown that when challenges and skills are relatively high and in balance, the experience of flow likely ensues (Csikszentmihalyi and Csikszentmihalyi, 1988; Csikszentmihalyi, 1990, 1997). The flow model is often depicted by a chart similar to that shown in **Figure 1**. The figure describes four different channels of experience, each defined by the relative relationship between challenge and skill. When challenges and skills are both high, individuals tend to experience flow. Instances marked by high challenges but low skills tend to produce anxiety, while instances marked by low challenges but high skills produce relaxation (or at the extreme, boredom). Finally, instances of low challenges and low skills tend to produce feelings of apathy. Some researchers have further parsed these basic four channels of experience into 8 or even 16 channels (see Massimini and Carli, 1988), but in the interest of simplicity, and to preserve the focus on the flow state, only the more basic model is presented here.

The flow model itself is dynamic and is designed to account for changes in ability and circumstance: as an individual becomes more skilled, a given activity becomes decreasingly challenging, with the result that a person may cease to experience flow. In order to maintain one's



**Figure 1** Channels of subjective experience.

state of flow, the challenges of one's activities must be increased by choosing a more difficult task, setting a higher goal, or otherwise manipulating one's circumstances to bring challenges and skills back into a state of balance. Likewise, an individual may take on a task that is more challenging than one's skills are able to address at the moment, producing a state of anxiety. This anxiety can be relieved either by taking action to rapidly improve one's skills and bring them into alignment with the current challenges, or by adjusting one's activities and/or goals downward, so that the challenges of the activity are more in line with one's current skills. When viewed in an educational context, this dynamic nature of the flow model is similar in many ways to the zone of proximal development (Vygotsky, 1962; Gray and Feldman, 2004).

Some activities by their very nature are structured in such a way that proximal goals and feedback are more salient, challenges can be manipulated to best match one's skills, and distractions are minimized to focus attention. Indeed, there is some evidence that certain activities (e.g., making music and competitive athletics) are more likely than others to produce flow (Csikszentmihalyi, 1990). Nevertheless, flow refers only to a subjective phenomenology, suggesting that what matters most is that these conditions are salient to the individual, not necessarily inherent to the activity itself. Individuals have the capacity to identify challenges in seemingly unchallenging situations, define proximal goals and rules for engagement, and focus attention in such a way as to create the conditions for flow even when such conditions are absent from the task at hand. What is most essential for the experience of flow appears to be one's subjective perception of challenge, skills, goals, feedback, autonomy, and focused attention. Accordingly, numerous investigations have documented the flow state among individuals while doing daily household chores (Csikszentmihalyi, 1990), working in factory jobs (LeFevre, 1988), living in concentration camps (Logan, 1985), and in other situations that might appear on the surface to be counterproductive to the experience of flow (for a review, see Csikszentmihalyi, 1990).

The experience of flow may be related to personal characteristics. Adolescents who are highly optimistic and those with higher self-esteem generally report higher levels of flow than their peers (Schmidt *et al.*, 2007). Adolescent females tend to report more flow than males (Shernoff *et al.*, 2000). Turning specifically to individual characteristics related to flow in classrooms, American 12th graders report more flow in school than 10th graders, ethnic minority students report more flow than white students, and students from lower socioeconomic backgrounds appear to report more flow in school than their more advantaged peers (Shernoff and Schmidt, under review).

The momentary experience of flow is also linked to sustained engagement in tasks. Individuals who experience flow are likely to seek out these optimal experiences again,

with the result that they develop commitments to certain tasks or fields of engagement. This phenomenon has been referred to as emergent motivation, because one's desire to continue to pursue an activity emerges from the very experience of engaging in the activity. This perspective has been applied to the study of long-term academic pursuits. For example, Csikszentmihalyi, *et al.* (1993) demonstrated that students who have positive subjective experiences in a particular academic domain demonstrate greater commitment to that domain several years later. Csikszentmihalyi and Schneider (2000) demonstrated similar links between classroom experiences and students' future aspirations.

### The Paradox of Flow in Educational Contexts

While the flow model was developed as a model of engagement more generally, it is not difficult to see the numerous applications to academic engagement. Many of the conditions that facilitate flow are present and manipulable in most classroom environments. While most academic activities are not freely chosen, there is some room to offer choice in learning activities. The balance between challenges and skills can certainly be adjusted to promote a state of optimal balance for students. Goal setting and feedback are both regular parts of most classroom settings. Finally, teachers can minimize distractions to promote attention to the task at hand. According to the model, if some or all of these conditions could be facilitated in classrooms, several things would be more likely to occur; students would likely experience flow when engaged in academic tasks, having positive subjective learning experiences. These positive experiences would motivate students to continue their deep engagement in tasks, as they would desire to maintain their positive flow state. As it is a dynamic process that keeps one in a flow state, learning would occur in order to keep one's skills in balance with the ever-increasing challenges presented by the classroom environment. Over time, such engagement would develop into long-term commitments to particular academic endeavors, and ideally, to increased success with related academic tasks.

Research has confirmed that some of the conditions that tend to promote flow are often present in educational settings. Specifically, adolescents experience high levels of challenge and skill more often in school than in any other context of their lives (Csikszentmihalyi, 1990). Recent research in American schools has suggested that while the challenge and skill conditions are often present in schools, students generally do not feel the deep concentration, involvement, and enjoyment that typically follow from these conditions. (Schmidt, *et al.*, 2007) Similar findings were obtained in a study of Italian students (Delle Fave *et al.*, 2002). The context of school is a unique setting in that the flow experience does not seem to follow from these two basic conditions as is the case in other contexts.

It appears to be academic classes, in particular, where the link between the flow conditions and the flow experience fails to exist. Research examining traditional middle and high school classrooms from the perspective of flow theory suggests that the instructional practices that are typically used in classrooms may lack certain other conditions for flow. Most high school students still spend a majority of their classroom time doing individual seatwork or listening to lecture, and while these activities may present significant challenges in which children can apply their skills, they tend not to be very involving for students (Shernoff, *et al.*, 2003).

Turner and colleagues (1998), similarly, have argued that specific instructional practices may promote flow experiences more often than others. They found that middle school students experienced the most flow when their teachers provided more scaffolded instruction (thus manipulating the balance of challenge and skill) and when they used instructional practices that fostered intrinsic motivation, such as providing choices and taking interests of students into account. The problem is that at the middle and high school level, the practices that produce the flow experience tend to be few and far between.

Schweinle, *et al.* (2006) provide further explanation for this disconnect between the flow conditions and the experience of flow in classrooms. In a study of elementary school mathematics classes, the researchers found that activities generally perceived by students to be challenging, were largely viewed as a threat to students' self-efficacy and were not seen as an opportunity to develop new skills. The authors speculate that children in elementary grades may have a different and more negative definition of challenge than older individuals. It may not be until individuals are older that they can view challenges more positively, after they have experienced the opportunities that optimal challenges can provide.

These studies suggest that while challenges and skills are often present, some of the other conditions for flow tend to be lacking in classrooms. Conditions for the flow experience also include: recall that focused attention, clear short-term goals, and the feeling that one is engaged in an activity that is freely chosen. Arguably, many traditional classroom environments might be characterized as places where students have little choice about their learning activities, and where the focus is on longer-term goals (e.g., completing the assignment, getting a good grade) rather than short-term goals (e.g., completing one small step at a time). In addition, a bustling classroom where students shift their attention from subject to subject after only a short period of engagement may not be the ideal place to promote focused attention. Indeed, there is some empirical evidence that in the rare cases where these additional conditions are present in classrooms, the flow experience is more likely to occur (Shernoff *et al.*, 2003, Schmidt *et al.*, 2007).

There are certain settings that do appear to consistently promote flow. When in nonacademic classes like fine arts or music, students experience greater levels of flow than in almost any other context, inside or outside of school (Schmidt, *et al.*, 2007). Similarly, in those relatively rare instances where students are involved in more hands-on, collaborative work in their academic classrooms, the experience of flow is more frequent (Shernoff *et al.*, 2003). Given that the flow state is more likely when students are engaged in these active learning environments, it is not surprising that students in nontraditional learning environments that emphasize active learning tend to experience more flow. Rathunde and Csikszentmihalyi (2005a, 2005b) compared the experience of students in traditional public middle schools to students in a Montessori school. While students in the two school types did not differ from one another in their subjective experience of nonschool activities, their experience of school was very different in that Montessori students experienced flow much more often than students in a traditional school. In 2004, Johnson obtained similar results in a study that compared the experience of students in a traditional American high school with that of students in an alternative high school with greater emphasis on student autonomy.

Andersen (2004, 2005a, 2005b, 2007) has conducted comparative studies in several Scandinavian countries and in Japan in which he observed classrooms and interviewed students about their flow experiences. Primary-grade students in Denmark experience particularly high levels of flow in school compared to students in other countries. These findings may be due to an emphasis on student autonomy, interest, and an appropriate balance between teacher-led and student-led learning activities (Andersen, 2004). These observations are consistent with the findings discussed earlier in which challenge and skill alone appear to be insufficient to produce flow in school contexts. Autonomy and control appear to be particularly critical conditions for fostering flow in school. It is important to note, however, that although Danish students were by far the most engaged in school, they lagged behind students from other countries (specifically Finland) in their performance of basic academic skills (Andersen, 2005a). These results suggest that schools should be warned against promoting engagement in school at the expense of demanding competence when it comes to basic skills.

Anderson's (2005b) work in Japan has identified several elementary schools and afternoon programs that are specifically designed to promote optimal learning among students. Central to these programs is a collaborative learning environment in which both students and teachers are expected to learn and develop through the use of computer-based activities and other advanced problem-solving activities. Classroom activities require frequent changes not only in activity, but also in students' physical

placement in the room, moving from group discussions, to hands-on projects, to teacher lecture-discussions, to computer sessions, all focused on the same subject matter. Andersen reports that students who participate in these programs not only experience a high degree of flow, but also develop deep understanding of the academic material. Unlike the Scandinavian programs studied, these Japanese programs have achieved a balance between the promotion of engagement and focus on learning outcomes.

### Putting Flow theory into Practice: The Key School

While researchers have been able to identify those moments when students experience flow in school and link them to specific personal characteristics, instructional practices, or academic programs, most of the work presented thus far does not represent intentional application of flow theory *per se*. However, there are individual teachers, and indeed entire schools or school programs that have done substantial work to incorporate the conditions for flow into their learning environments. One of the longest-standing and most successful models of this is the Key Learning Community in Indianapolis, Indiana in the United States. The Key School is a magnet school that is part of the Indianapolis Public School System. Begun in 1987 as an elementary school, Key now serves elementary, middle, and high school students on two separate campuses. From its inception, the school has been structured to promote flow and intrinsically motivated behavior among its students. This mission has been carried out in several ways, including the development of courses and curricula that place equal emphasis on Gardner's (1993) multiple intelligences.

Perhaps the most intriguing application of flow theory has been the school's Flow Center. Students are scheduled to spend time in the Flow Center each week, just as they would spend time in any other class. The purpose of the center is to provide students with the opportunity to experience flow, so that they may recognize the positive nature of this state and be motivated to seek it out in their other scholastic activities. Knowing that many of the conditions for flow are themselves highly individual and subjective, the designers of the Flow Center recognize that the flow experience simply cannot be created for all students in a classroom context by the manipulation of activities or expectations by some external person (usually the teacher). What is more valuable then is to provide students with the tools to create flow for themselves, so that they can facilitate their own flow in a variety of environments. In order to help students experience flow, the Flow Center is equipped with a variety of games, puzzles and challenging activities for students to engage in. Students are free to choose their own activities in the Flow Center on the one condition that

the time spent in there is not treated as recess or downtime but is intended for problem-solving activities. The mission of the flow room is to help students realize that they can become deeply engaged in activities that are educational, and that the same processes they used in the flow room (whatever they are) can be applied in other areas of their studies (see Whalen and Csikszentmihalyi, 1991 for further description).

Evidence suggests that these modifications in the school environment translate into academic success. In addition to an uncommon sense of excitement about learning observed by visitors to the school, more standard measures point to success as well. Standardized test scores for students at the elementary and high school level are consistently higher than those of students at other schools in the district, though it is important to note that the high school program has existed only a short time, with the first students graduating in 2003. While only time will reveal the long-term success of these students, all initial indications are positive. In the years for which data are available, the school posts graduation rates at or near 100%, with the vast majority of graduates pursuing postsecondary education.

### Looking Back, Looking Ahead

An examination of students' educational experience from the perspective of flow theory is informative to both researchers and educators in that it helps us understand the personal and situational factors that promote students' deep engagement in learning. There is enormous potential for students to experience flow in schools, but this potential is often thwarted because some key conditions for flow are largely missing from many of today's classrooms. While students generally experience two of the main conditions in that they are using their skills to address increased levels of challenges in the classroom, they often fail to experience flow. This may be because school environments generally offer few opportunities for choice. Moreover, the goals and feedback in classrooms may be focused on a target that is less immediate than the goals that are usually salient in flow experiences. Finally, classrooms may need to be structured in a way that helps students focus their attention on the tasks at hand.

Most encouraging is the fact that flow is consistently observed in a number of unique school contexts. Students often feel flow in their nonacademic classes, most of which provide a number of flow conditions like choice, autonomy, and focus that are typically absent in academic subjects. Likewise, students tend to experience flow when engaged in hands-on learning tasks. Additionally, a number of non-traditional schools and school programs are very successful in facilitating flow among their students – this appears to

be attributable to greater focus on many of the conditions that produce flow. Teachers interested in increasing their students' engagement in classrooms may learn a lot by examining the structure of nonacademic classes, as well as the nontraditional programs mentioned here, to take some cues about how to create more of the conditions for flow in students' everyday experience.

Looking to the future of research on flow in education, there is still much work to be done. First, more research needs to be done linking the experience of flow in academic pursuits with a variety of learning outcomes, as the few studies that have addressed this issue have produced mixed results. Future research must further examine the nature of links between the experience of flow and specific learning outcomes. Additionally, more research is needed to understand the link between flow in a given subject area, and long-term commitment to that field.

Second, relatively little work has been done to examine the role of flow in learning environments beyond the classroom. One emerging application of flow theory in education concerns the use of computers and video games. Children and adolescents frequently experience flow when engaged in video and computer games (Bassi and Delle Fave, 2004). In recent years, researchers and educators alike have attempted to use the appeal of videogames to construct interactive computer technology for learning. A growing body of evidence suggests not only that these e-learning environments can be intensely engaging, but also that such engagement is linked to a variety of positive learning outcomes (Coller and Shernoff, 2006; Pearce, 2005; see Scorsby and Shelton, 2007 for a review). An examination of the e-learning experience from the perspective of flow theory will assist in the understanding and design of these increasingly used educational tools. Likewise, researchers should continue to examine the role of flow as it relates to learning in other extracurricular environments.

Third, the vast majority of research on flow in education has involved children and adolescents. While the experience of flow appears to be consistent across age groups, it is possible that certain conditions for flow, similar to challenge or autonomy, might be differentially salient to learners of different ages. Thus, examining a broader age range of learners, including adults, would be informative. In general, research on flow in schools should take into consideration the developmental stage of the students under investigation.

Finally, we must not forget that teachers play a key role in educational processes – an examination of teachers from the perspective of flow theory would be informative as well. Dissertation work by Di Bianca, in 2000, suggests that when teachers report the most flow, students generally report the least. In other words, those moments that are most engaging to teachers are least engaging to students. Further research is needed to corroborate and explain these findings.

The flow model and related research provides a solid base of knowledge regarding how students might become more engaged in their learning and how they feel when they are so engaged. This knowledge base is of practical use to educators interested in increasing student engagement. There is, however, much work remaining to be done in this field in order to more fully understand the complexities of flow's role in educational processes.

**See also:** Constructivism and Learning; Development of Creativity; Emotion in Educational Contexts; Interest; Intrinsic and Extrinsic Motivation; Motivating Students in Classrooms; Motivation Regulation; Volitional Control of Learning.

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## Relevant Websites

- <http://www.616.ips.k12.in.us> – Key Learning Community in Indianapolis, Indiana, US.
- <http://www.legolearning.net> – Lego Learning Institute (contains work of F.O Andersen).
- <http://www.ppc.sas.upenn.edu> – Positive Psychology Center at University of Pennsylvania.