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Flow in Schools
Cultivating Engaged Learners and Optimal Learning Environments

DAVID J. SHERNOFF AND MIHALY CSIKSZENTMIHALYI

Educators have often observed that children have limitless curiosity and thirst for knowledge before they enter school (e.g., Jackson, 1968). Several years later, those same children can be found in school buildings with their minds wandering and attention straying. Suddenly, student motivation is a problem. Public schools are continually characterized by pervasive boredom (Goodlad, 1984; Steinberg, Brown, & Dornbusch, 1996), with up to two-thirds of public school students classified as disengaged from learning (Cothran & Ennis, 2000). Student perceptions of school appear to range from apathy to anger (Gilman & Anderman, 2006). This holds true for students nationally and internationally (Larson & Richards, 1991). So, if children begin life as curious learners, why is it that they dislike the main place that they come together to learn?

Schools have historically struggled to provide meaningful, intrinsically motivating experiences for many youth. Students see themselves as passive participants in a mass, anonymous educational system (Larson & Richards, 1991). Increasingly, there is the sense that frustration is a close cousin to boredom, frustration stemming from an inability to act or to be somebody—learned powerlessness, if you will. Fostering student motivation and enjoyment in learning has become a dominant concern, and one that has been effectively addressed through a variety of perspectives, including a focus on self-efficacy (Bandura, 1997), self-determination (Ryan & Deci, 2000), and goal orientations (Ames, 1992). Yet, many students remain feeling apathetic towards school.

Can positive psychology foster healthier schools, with its focus on optimal health and human functioning rather than on illness? The concept of optimal experience, or flow, has served as a theoretical cornerstone of positive psychology (Seligman & Csikszentmihalyi, 2000). In this chapter, we illustrate how flow theory can help explain student engagement and enjoyment in learning by reviewing multiple studies bearing on this issue over the last 20 years. We focus on the environmental and personal factors that can influence student engagement, leading towards a conceptual summary of those influences as well as outcomes associated with engagement. Next, we highlight several promising school contexts that can foster optimal learning experiences, before closing with some new directions in this line of research.

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Flow and Learning

By interviewing individuals from diverse backgrounds about their peak experiences, Csikszentmihalyi (1990) and colleagues identified the phenomenological characteristics of the most meaningful and satisfying moments in life. From rock climbers to chess players to accomplished scientists and artists, optimal experiences in diverse activities were often described in similar terms: intense concentration and absorption in an activity with no psychic energy left over for distractions, a merging of awareness with action, a feeling of control, loss of self consciousness, and a contraction of the normal sense of time (i.e., time seems to fly). "Flow" describes the subjective buoyancy of experience when skillful and successful action seems effortless, even when a great deal of physical or mental energy is exerted. The subjective experience of flow also appeared to be enhanced by certain properties of the task. In most flow activities, goals were clear, and feedback with respect to meeting those goals was immediate and forthcoming. The activities were also *autotelic*, or a goal in-and-of-itself performed for the sheer experience of it—sometimes even in the face of personal risk or danger.

Perhaps the most central condition for flow experiences to occur is that the challenge of the activity is well matched to the individual's skills. That is, the challenges and skills are high and in balance—individuals stretch their skills to their limits in pursuit of a challenging goal. Csikszentmihalyi reasoned that various combinations of high or low challenges and skills predicts distinct psychological states: (a) apathy, resulting from low challenge and low skill; (b) relaxation, resulting from high skill but low challenge; (c) anxiety, resulting from high challenge but low skill; and finally (d) flow, resulting from high challenge combined with high skill. As concrete examples of these states, if an intermediate level female skier first skis on a bunny slope, she may find that she has more skills than required and feels only relaxation as she takes in the scenery. If she continues to ski on this slope, boredom may set in. Later in the day, when confronted with a slope that is too steep, bumpy, or icy for her ability, anxiety sets in until she safely navigates her way down. Only on her favorite slopes that are quite challenging for her ability, but not excessively so, does she feel herself enter into an enjoyable, rhythmic peak experience in which time seems to stand still.

Flow experiences can involve mental tasks as much as physical ones. Anyone who has been "sucked into" a good novel that could not be set down implicitly understands the phenomenon. Here again, an experienced reader may not enter the flow state reading a children's book. A more sophisticated novel appeals not only to one's reading ability, but stimulates a full array of skills: to understand the geographical and historical context, infer the motivations of the characters, or solve the central mystery. The relationship between flow and the balance of challenge and skills has been empirically supported in numerous settings (e.g., Csikszentmihalyi & Csikszentmihalyi, 1988; for a recent comprehensive review of the concept of flow and related empirical research, see Nakamura & Csikszentmihalyi, 2002).

The theory of flow is inherently related to learning. When learning a new skill, the challenge of undertaking even a basic task may exceed a student's beginning level of ability, and hence they may feel overwhelmed—even "Twinkle, Twinkle Little Star" may be too difficult for the novice pianist. To reach flow, the level of skill must increase to match the challenge. Much like Vygotsky's *zone of proximal development,* the level in which most learning occurs is just one step beyond the skills one has already mastered. In this case, sufficient practice may be needed until the song is mastered. Once the song is played comfortably with relative ease, learning a new song at a higher level of challenge, causing one's skill to increase yet again, can restart a cycle of fresh learning. Thus, the pianist may progress through increasingly difficult songs at ever higher levels of skill. Flow is experienced at the highest level of challenge and skill for that individual—as when a master pianist is playing a Mozart concerto.

In addition, flow activities tend to be selected and replicated over time because they are so gratifying. This process of *psychological selection* plays a crucial role in the development of specific interests, goals, and talents over the course of one's life (Delle Fave & Massimini, 2003). Flow has been empirically related to the development of talent in adolescents (Csikszentmihalyi, Rathunde, & Whalen, 1993). In addition, highly creative adult artists and scholars have reported flow when they are engaged in the creative processes of discovery and invention (Csikszentmihalyi, 1996).

Measuring Flow and Engagement in Learning

In the past 25 years, the study of flow has been pursued mainly through the use of the Experience Sampling Method (or ESM; Hektner, Schmidt, & Csikszentmihalyi, 2007). Respondents carry a paging device (usually a programmable wristwatch), which signals them at random moments throughout the day. Each time they are signaled, they complete a brief questionnaire in which they answer open-ended and scaled questions about the day and time of the signal, their activities and thoughts, as well as the cognitive, affective and motivational qualities of their experience. Example items include: "As you were beeped, did you *enjoy* what you were doing?" "How well were you *concentrating*?" "Was this activity *interesting*?" In addition, ratings are given for the challenge of the activity and the respondent's skill in the activity. By reporting on immediate experiences throughout waking hours over several days, the ESM solicits repeated "snapshots" of subjective experience, and improves upon the problem of recall and estimation errors inherent to surveys and interviews. For reliability and validity information regarding the ESM, the reader is referred to Hektner, Schmidt, and Csikszentmihalyi (2007).

Based on flow theory, we conceptualized and measured *student engagement* as the simultaneous occurrence of high *concentration*, *enjoyment*, and *interest* in learning activities (Shernoff, Csikszentmihalyi, Schneider, & Shernoff, 2003). *Concentration*, which is central to flow (Csikszentmihalyi, 1990), is related to meaningful learning (Montessori, 1967), including depth of cognitive processing and academic performance (Corno & Mandinach, 1983). *Enjoyment* is related to the demonstration of competencies, creative accomplishment, and school performance (Csikszentmihalyi et al., 1993; Nakamura, 1988). Finally, i*nterest* directs attention, reflects intrinsic motivation, stimulates the desire to continue engagement in an activity, and is related to school achievement (Hidi, 1990; Schiefele, Krapp, & Winteler, 1992).

What Flow Theory and the ESM Have Taught Us About Student Engagement in Public Schools

Initial ESM research in U.S. public schools has highlighted the rarity of flow experiences while in school (Csikszentmihalyi & Larson, 1984). Our research of student engagement (see Shernoff, 2001; Shernoff et al., 2003; Shernoff & Hoogstra, 2001) focused on a national sample of 526 high school students who participated in the Sloan Study of Youth and Social Development (SSYSD; see Csikszentmihalyi & Schneider, 2000) in three separate cohorts in the 1990s. A total of 3,630 self-reports occurring inside public high school classrooms were analyzed for both the influences on and outcome springing from student engagement.

Student engagement was highest when concentration, enjoyment, and interest were simultaneously elevated. Further, as flow theory would predict, student engagement was maximized in classroom experiences in which perceived challenge and skill were above average compared to those marked by apathy (i.e., low challenge, low skill), anxiety (i.e., high challenge, low skill), or relaxation (i.e., low challenge, high skill) (Shernoff et al., 2003). Moreover, students spent the largest chunks of time in class doing less engaging activities, such as individual work, listening to lectures,

taking notes, and doing homework or studying. Much smaller amounts of time were spent more interactively in discussions, group or lab work, or talking with teachers individually. Finally, high school students were less engaged while in classrooms than anywhere else. Their concentration was higher than outside of classrooms, but their level of interest was lower and their enjoyment was especially low. Students were also found to be thinking about topics entirely unrelated to academics a full 40% of the time in classrooms (Shernoff, 2001).

These findings support the notion of schooling as largely a passive, individualistic, and teacher-controlled activity dominated by direct instruction (Goodlad, 1984). Although repeated studies have found that schools do engender heightened concentration during classes, alternative approaches appear to be needed in order to provide what is most lacking: greater enjoyment, motivation, and opportunities for action in the learning process (Bassi & Delle Fave, 2004; Shernoff et al., 2003).

Perceptual and Contextual Factors Influencing Student Engagement

Perceptual Factors

Concentration, attentiveness, and student engagement were significantly higher when instruction was perceived as challenging and relevant (Shernoff et al., 2003). This finding suggests that students are more likely to become engaged when academic work intellectually involves them in a process of meaningful inquiry extending beyond the classroom (Newmann, Wehlage, & Lamborn, 1992). Students experienced greater enjoyment, motivation, self-esteem, and overall engagement when they perceived themselves to be active, in control, and competent. Such findings suggest that the perception of competence and autonomy contributes to students' motivation, perhaps via self-efficacy and perceptions of self-worth, as suggested in much of the motivational literature (Schunk, Pintrich, & Meece, 2008).

In keeping with flow theory, students were optimally engaged when the level of challenge was a good match for their skills, so that perceived challenges and skills were both high and in balance. Concentration and attention in classrooms were optimized by an appropriate balance between challenge and skills, where "appropriate" may be taken to mean offering the reasonable prospect of success with a good faith effort (Brophy, 1983). For example, students were found to be paying attention 43% of the time in the apathy condition, but 73% of the time—almost twice as frequently—when challenges and skills were both perceived to be high. Optimally engaging activities were therefore neither trivially simple nor impossibly hard; rather, the appropriate match between challenge and skill led to higher quality learning experiences in terms of perceived engagement, intrinsic motivation, mood, and self-esteem.

Contextual Factors

Student engagement appeared to be significantly influenced by the activity in which students were involved. Students were more engaged in group and individual work than while listening to a lecture or watching TV or a video. While taking a test or quiz, students reported very high levels of concentration, but low enjoyment. Overall, students were more engaged during instructional methods that present opportunities for action and to demonstrate their skills, but such activities were rare while the disengaging activities were more common.

Similar results were reported by Peterson and Miller (2004), also using the ESM. The researchers compared the quality of experience of 113 students from a private, mid-Atlantic university while participating in cooperative learning activities to their experience while in large group instruction. Students reported greater flow, task importance, on-task attentiveness, and engagement during cooperative learning tasks than during large group instruction. Their finding with respect to atten-

tiveness corroborated our own research (Shernoff, Knauth, & Makris, 2000). What is most striking was that both studies using high school students (Shernoff et al., 2000) and the college students (Peterson & Miller, 2004) found small groups to be one setting in which students reported both high concentration and high enjoyment, the combination indicative of meaningful engagement.

Students in our sample were also significantly more engaged in their non-academic courses than in their academic courses. This finding may be partially explained by the differences between subjects with respect to allocation of time using various instructional formats. Students spent more time in high-engagement activities (e.g., individual or group work) during their non-academic classes, and more time in low-engagement activities (e.g., lecture, video) during their academic ones.

Variables Associated with Engagement

Individual Variables

Some research has suggested that fluctuations in engagement (Hunter & Csikszentmihalyi, 2003) and boredom (Larson & Richards, 1991) are in part the result of individual differences. Personality traits associated with high levels of flow include optimism and self-esteem (Schmidt, Shernoff, & Csikszentmihalyi, 2007). In our studies, background characteristics also influenced engagement (Shernoff, 2001). For example, family supportiveness had a positive influence in engagement. Further, female high school students reported higher levels of flow in classrooms than did males (Shernoff et al., 2000), but this may well be a reflection of the tendency for females to report higher levels of flow across all contexts (Schmidt et al., 2007). Moreover, older students (i.e., 12th graders) also reported higher engagement than younger students (i.e., 10th graders). Finally, African American students reported experiencing more flow in classrooms than Caucasian students, as did students from low socioeconomic communities compared to those from high socioeconomic communities. The tendency for ethnic minority students and those from low socioeconomic backgrounds to be more engaged in comparison with Caucasian students and those from high socioeconomic backgrounds, respectively (Shernoff & Schmidt, in press), has been corroborated in other ESM studies of engagement (Lindstrom, Ulriksson, Arnegard, & Brenner, 2005; Uekawa, Borman, & Reginald, 2006) as well as those using other methodologies (M. K. Johnson, Crosnoe, & Elder, 2001).

Ability Level

Ability level has been found to be a significant factor influencing the quality of school experiences. Csikszentmihalyi et al. (1993) found that talented and committed adolescents reported being happier, more cheerful, and more motivated in school than their less talented counterparts. In a group of 130 Italian adolescents, those with high self-efficacy associated their school work with optimal experience unlike those with low self-efficacy (Bassi, Steca, Delle Fave, & Caprara, 2007). The literature also supports a relationship between quality of experience in school work and academic achievement, although the nature and directionality of this relationship is unclear. A number of studies have associated flow with commitment and achievement in the high school years (e.g., Carli, Delle Fave, & Massimini, 1988; Nakamura, 1988). On the other hand, (Larson & Richards, 1991) found higher rates of boredom at school among those with higher achievement test scores.

Engagement and Educational Outcomes

Differences in engagement across achievement levels raise the question of what short- and long-term academic outcomes are associated with student engagement. With respect to short-term outcomes,

in our studies there was a significant relationship between engagement and reported grades after controlling for background characteristics (Shernoff & Schmidt, 2008). In a follow-up study in which we interviewed the high school sample several years later once they had enrolled in college (Shernoff & Hoogstra, 2001), we tested whether students reporting high engagement in math and science classes during high school were more likely to continue their interest in those subjects (as demonstrated by majoring in them 2 years later). After accounting for student background characteristics including academic performance, engagement was a significant predictor of continuing motivation in science. Enjoyment and interest during high school science class were the strongest predictors of choosing a science-related major in college. In addition, student engagement in high school math and science classes was the strongest predictor of reported grades in college—even stronger than grades in high school. These findings suggest that spontaneous engagement with school learning may operate in subtle ways that have important, long-term effects on students' intellectual and professional development.

Conceptual Model of Student Engagement and Optimal Learning Environments

Based on our studies (Shernoff, 2001; Shernoff et al., 2003; Shernoff & Hoogstra, 2001), there are two separate processes related to student engagement (see Figure 11.1). Challenge and relevance have strong effects on students' concentration, interest, and attention. We refer to these aspects as *academic intensity*. For example, students taking a test or a quiz, or completing tasks in math class are usually very challenged and concentrate very hard, but do not enjoy the experience. On the other hand, experiencing high skill, control, and activity level are associated with significant increases in positive affect, enjoyment, esteem, and intrinsic motivation. This process, which we refer to as a *positive emotional response,* is distinguished from the more cognitive nature of academic intensity. For example, students usually enjoy watching TV or a video, and attending art class, but

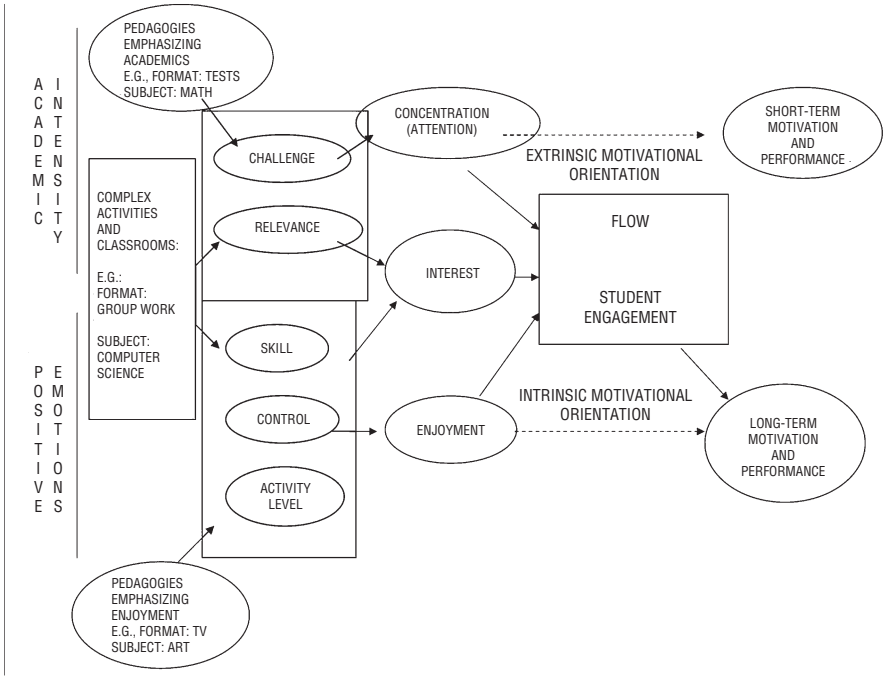

Figure 11.1 Empirically-based model of influences on student engagement and related outcomes.

they report these experiences as low in academic intensity. Thus, both academic intensity and a positive emotional response are integral parts of optimal engagement in the learning process. However, supporting previous studies (e.g., Csikszentmihalyi & Schneider, 2000; Rathunde, 1993), we found that both processes seldom operate together during school instruction.

Some learning experiences are lacking in both aspects of engagement, such as when students listened to a teacher lecture (Shernoff, 2001). Activities or environments that can combine both aspects of engagement, such as individual work in computer science class or a group lab activity in science class, are of utmost importance, however, because they suggest examples of *meaningful engagement.*

Furthermore, academic intensity appears to be more related to short-term performance than positive emotions. For example, attention appears to have a stronger relationship with short-term performance than many of the more emotionally-based factors, and may be externally motivated. On the other hand, the emotional side of engagement, particularly students' enjoyment and interest, appears to be a strong predictor of long-term performance and motivation, and the source of motivation appears to be more intrinsic. This model suggests that activities that are both academically intense and foster positive emotions are more likely to engage students both in the short term and in the long term. Therefore, optimal learning environments include activities that are challenging and relevant, and yet also allow students to feel confident and in control, exact concentration but also provide enjoyment; are intrinsically satisfying in the short-term, as well as build a foundation of skills and interest for the future; and involve both intellect and feelings (Shernoff, 2001).

What About the Teacher's Role?

An obvious influence on students' engagement or boredom is the teacher, but not all ESM studies have gathered data from the teacher or related experiential information from students to the teacher's actions. By combining a modified version of the ESM with classroom observations, Turner, Meyer, and colleagues (Schweinle, Meyer, & Turner, 2006; Turner & Meyer, 2004; Turner, Meyer, Cox, Logan, DiCintio, & Thomas, 1998) illuminate how the teacher plays a critical role in cultivating optimal learning environments. For example, Turner et al. (1998) examined the relationship between teachers' instructional discourse with students and involvement in mathematics instruction. Fifth- and sixth-grade students in seven mathematics classrooms completed questionnaires regarding their experience at the end of four or five class periods rather than being beeped at random times in classrooms. The extent of students' involvement was determined by the match between challenges and skills based on the flow paradigm.

The results found that students in high involvement classrooms reported feeling more intrinsically motivated, open, and relaxed than those from low involvement classrooms. The researchers also observed differences in instructional interactions between high- and low-involvement classrooms. Specifically, teachers in high-involvement classrooms fostered intrinsic motivation and utilized more scaffolded instruction to adjust the challenge of the material to students' level of skill. Teachers of high involvement classrooms directed more attention than those in low-involvement classrooms to helping students reach understanding and become autonomous learners. Conversely, teachers in low-involvement classes tended to emphasize procedures and used extrinsic incentives with higher frequency.

Turner and Meyer (2004) conclude from their studies that instruction providing both challenge and emotional support is necessary for promoting positive motivation. Their prescription supports our conceptual model of optimal learning environment as incorporating both academic intensity and support for positive emotions. Their observational research provides a rich, contextualized picture of how skilled teachers go about achieving optimal levels of challenge and support. For

example, optimally engaging teachers might require fewer problems, but challenging ones, and support the competence necessary to solve them independently. Teachers also ask questions for higher order conceptual understanding, combined with providing the feedback, strategies, and encouragement that are emotionally supportive. Emotional supportiveness is also modeled through enthusiasm, humor, and risk-taking.

Educational Contexts Promoting Engagement

To summarize our research so far: There is not a great deal of flow or engagement in traditional U.S. public schools as a whole, but there are exceptions to this trend. Over the past decade, researchers have gained insights into ways to promote optimal learning environments, where experiencing flow and high engagement are the norm rather than the exception. The following is a review of recent research in several educational contexts that hold promise for understanding optimal learning environments: alternative schools (a nontraditional public school in Seattle, Washington, and selected Montessori middle schools), non-traditional public school programs (particularly the Key School in Indianapolis and the PASS program in California and Illinois), organized after-school programs, and selected schools in foreign countries (especially in Scandinavia and Japan).

Selected Private Schools

Two sets of studies have recently compared the quality of students' experience in selected private schools to experiences garnered in traditional public schools, using the SSYSD sample to represent the traditional public schools. Because we have already described engagement in the traditional public schools based on our analysis of the SSYSD data, we will focus here on engagement in the respective private schools.

A Nontraditional High School in Seattle, Washington

In the first study, Johnson (2004) collected ESM data from students (n = 80) attending an nontraditional, urban public high school (Nova High School) in Seattle, Washington, and compared these data to comparable school students in traditional public schools (n = 80). As some background, the Nova High School consistently achieves among the highest SAT scores among the city's high schools. The school is democratically governed by students and staff, and promotes egalitarian relationships. The school also supports students' autonomy in their decision to select and attend an unusual diversity of courses. Other unique aspects of the school's philosophy include (a) creating a community climate among teachers, students, and administration, which involves mutual respect, involvement, and fairness, (b) coordinating curriculum with input from students, and (c) issuing academic "credits" rather than letter grades. Results revealed that students in the school spent a higher percentage of time in student-centered activities, and reported greater engagement in school and during lecture and independent study specifically. Lectures were infrequent, but when they occurred students found them to be more engaging. High engagement in the Nova school appeared to be highly influenced by students' sense of autonomy and belongingness.

Montessori Middle Schools

Rathunde and Csikszentmihalyi (2005a, 2005b) conducted a large-scale study measuring the quality of experience students (n = 290) from several Montessori middle schools. They compared these results to a demographically matched sample of public middle school students from the SSYSD.

As background information, the foundational writings of Maria Montessori emphasized intrinsic motivation and were consistent with modern theories of motivation on goal orientations as well as flow. Montessori observed children's "spontaneous concentration," which was similar to the concept of flow and engagement in exploration, play and learning activities. Montessori believed these episodes of spontaneous concentration were a normal part of development for healthy children. Similar to creating optimal environments for student engagement through challenge and emotional support, the Montessori philosophy emphasizes the creation of a "prepared environment" that integrates both freedom and high demands in order to create the likelihood of spontaneous concentration in learning activities (Rathunde & Csikszentmihalyi, 2005a).

As expected, the Montessori students had more positive perceptions of their teachers and schools compared to the traditional students (Rathunde & Csikszentmihalyi, 2005b; see also Johnson, 2004, for support evidence). They were also more likely to perceive their classmates as friends—a perception that grew over time. These positive perceptions are significant because previous research has found adolescents to have extremely low intrinsic motivation when with classmates, but extremely high intrinsic motivation when with friends (Csikszentmihalyi & Larson, 1984). Montessori students also spent more time in academic activities such as individual and group work (Rathunde & Csikszentmihalyi, 2005b). In contrast, students in public schools spent more time socializing and were more off-task with their studies. Corresponding differences in engagement and quality of experience were also observed. Montessori students reported higher combinations of high intrinsic motivation and importance indicative of *meaningful engagement* (Rathunde & Csikszentmihalyi, 2005a). In contrast, public school students reported greater salience and importance but low intrinsic motivation, a combination suggestive of a performance goals orientation. Despite one limitation of the study—that the Montessori schools included were not randomly selected—these findings suggest that the public school approach can be significantly improved in terms of engaging students cognitively, affectively, and motivationally.

Nontraditional Public School Programs

The Key School in Indianapolis, Indiana, is a nontraditional public school in which a group of teachers implement a K-12 curriculum based on flow theory and Gardner's (1993) theory of multiple intelligences. One of the unique innovations of the Key School is the creation of a flow activities room (Whalen & Csikszentmihalyi, 1991). Students in the Key School visit the "flow room" several times per week and freely participate in structured activities of choice. The main idea of the flow room is to allow students to develop and use different competencies in an intrinsically motivating fashion, skills that might otherwise go untapped by the traditional curriculum. Part of the hidden agenda is to infuse the rest of the more structured classes with a halo of enjoyment and enthusiasm. It was hypothesized that if certain learning experiences were enjoyable, students might realize that all of their educational encounters could be rewarding. Whalen and Csikszentmihalyi (1991) found that the degree of choice provided in the flow room helped students to discover and clarify their interests, and that intensified play led to the meaningful learning of process-oriented skills and sustained attention. They also found that the frequent flow and the high quality of experience reported when in the flow room was similar to that reported in students' favorite activities in other settings. In sum, the flow room allowed students to develop new talents while making the connection between intense enjoyment and concentration characteristic of flow. The level of transfer of flow to other educational experiences and settings, however, has not yet been directly studied.

Created by the American Sports Institute, the PASS program (Promoting Achievement in School through Sport) has been implemented in 28 middle and high schools primarily in California and Illinois, helping students to achieve academically—particularly those interested in sports

(Griffin, 1997). The goal of the PASS program is to offer an elective class that integrates the positive aspects of sports culture into the academic curriculum, which includes: (a) self-paced learning (individuals developing skills at their own pace), (b) mastery-based learning (moving on to the next level or assignment only after mastering the present skill), (c) relevance (knowing the reasons for working on a topic, and developing an intrinsic interest in it), (d) active engagement (as with sports, except applied to learning process), (e) performance learning (in which students must frequently demonstrate their skills in a variety of ways), (f) team-oriented learning (contributing the success of one's group as well as one's individual success), (g) character development (including concentration, balance, relaxation, power, and rhythm), and (h) project-based learning (relying on interdisciplinary fields of study). A distinctive feature of the PASS program is that it does not ask students to downplay their involvement in sports in favor of academics. Rather, it encourages youngsters' interest in sports and seeks to channel that same energy into making similar investments to school. In the process, the PASS program attempts to facilitate the realization that "giving 110%" can apply to goals beyond sports.

No studies have yet measured the quality of experience of students participating in PASS with the ESM; however, McCombs and Lauer (2002) assessed the PASS program for its alignment with APA Learner-Centered Principles and outcomes. On almost all measures of learner-centered practices, PASS teachers met or exceeded standards established by learner-centered models of excellence. In turn, students of PASS met or exceeded guidelines for motivation and learning such as the development of self-efficacy, epistemic curiosity, and task mastery goals.

Organized After-School Programs

In contrast with formal classroom activities, extracurricular activities that include academically enriching activities, athletics, and the arts have been associated with heightened levels of engagement, challenge, enjoyment, intrinsic motivation, and initiative among adolescents (Mahoney, Larson, & Eccles, 2005). The study of engagement in these contexts is a relatively new line of research with implications for positive youth development (Larson, 2000; Larson, Hansen, & Moneta, 2006). Using the ESM, Vandell, Shernoff, Pierce, Bolt, Dadisman, & Brown (2005) contrasted the experience of middle school students (n = 160) while at a variety of school-based after-school programs with their experience when at other types of after-school settings. While attending the after-school programs, the participants reported spending more time in sports activities and arts enrichment and less time watching TV and eating/snacking than was the case in other settings such as their homes. The adolescents also reported higher intrinsic motivation, concentrated effort (perceptions of high concentration, challenge, and use of skills), and positive mood states at the after-school programs than elsewhere after school, as well as in comparison to students who did not attend after-school programs (n = 31). The combination of higher concentrated effort and intrinsic motivation suggested that after-school programs may be an ideal environment for stimulating meaningful engagement.

Shernoff and Vandell (2007) found that students were most engaged in after-school programs that involved sports and arts enrichment activities. Students' affect was significantly higher while doing academic enrichment activities compared to homework, suggesting that a positive emotional response was enhanced when academic work was approached as a group activity with frequent feedback, allowing students to demonstrate their skills and initiative. Students also reported being more engaged in activities involving both adults and peers than activities with peers only. After school programs, then, were uniquely qualified as optimal learning environments by providing a diversity of enriching activities in which students interacted with peers while supervised by adults.

Selected Schools in Denmark, Finland, and Japan

Andersen (2005a,b; 2007) observed students in selected schools in a variety of countries and wrote reports on the high levels of engagement observed while in Denmark, Finland and Japan. He completed a "flow observation form" to rate the flow of students in classrooms, and followed up the observations with student interviews. Overall, Danish students reported above average on measures of flow during class time compared to students in a variety of other countries. Andersen attributes this finding to an emphasis on student autonomy, independence, initiative, and intrinsic motivation in Denmark, as well as the use of alternative forms of evaluation rather than grades. The quality of engagement among Danish students is high; however, these students are not as successful at learning basic academic skills when compared to Finish students (Andersen, 2005a).

In Japan, Andersen (2005b) observed the use of a variety of combined instructional methods in selected elementary schools, including computer use (with each child working on a laptop), collaborative discussions, individual reflections, and opportunities for practice. Learning was characterized by "action competence," referring to the acquisition of deep knowledge through processes of creativity, innovation and cause-effect experimentation. Quality of experience was characterized by high interest and self-direction as well as a greater frequency of flow experiences compared to that experienced in more teacher-centered methods in many other countries. Somewhat conversely from the Danish sample, Japanese elementary schools excelled at fostering higher order competencies and skills, but also tended to cultivate anxious students who did not enjoy school (Andersen, 2005a).

Andersen, (2005a) identified Finland as the closest among the countries he observed to providing the "best of both worlds"—in terms of combining learned "hard skills"—demonstrated by their superior international performance on reading and math competencies tests, with learned "soft skills" such as student-teacher collaboration to make a flexible curriculum. On the one hand, students were challenged to meet the scholastic demands of an increasingly detailed national curriculum as well as of a competitive global society; and on the other, students were involved in child-initiated, playful, creative, cooperative, and flow-enhancing activities. One of the most unique features of the Finish schools was that each 45-minute lesson was followed by a compulsory 15-minute break for outdoor games.

Table 11.1 presents a summary of these schools, including their key characteristics and Web sites for more information.

New Directions in Student Engagement Research

Flow, E-Learning, and Computer Games

Video games have become enormously popular among adolescents within the last 20 years, with adolescent youth in the United States spending more than 1 hour per day playing them on average and the vast majority owning at least one video game (Roberts, Foehr, & Rideout, 2005). Bassi and Delle Fave (2004) found that among the wide array of leisure activities to choose from, computer and video games became the number one leisure activity of choice among Italian adolescents, and was associated primarily with optimal experience or flow. Despite similar trends in the United States and other countries, interactive computer technology (such as virtual reality) is rarely used for class work or homework. Only recently have researchers considered their educational benefits (Grifiths, 1997). Scoresby and Shelton (2007) reference several associations researchers have made (e.g., Hedley, Billinghurst, Postner, May, & Kato, 2002; Witmer & Singer, 1998) between students reporting a sense of "presence," "being there," or "immersion" in different virtual reality interfaces and positive learning outcomes. Flow theory has been the natural theoretical base for exploring

Table 11.1 Summary of researched contexts cultivating student engagement and flow in schools

School/ Program	School/Program Type	Characteristics facilitating flow	Additional Information
The Nova High School, Seattle, WA	Nontraditional public high school	• Democratic governance • Egalitarian relationships • Community climate • Student contracts versus grades	www.novaproj.org/
Montessori (national)	Private middle schools	• Prepared environment for stimulating spontaneous concentration • Combination of freedom and high expectations	www.montessori.org/ www.amshq.org/ www.montessori-namta.org/ NAMTA/index.html
The Key School, Indianapolis, IN	Nontraditional public elementary school	• Emphasizes multiple intelligences • Uses flow activities room to develop untapped talents and cultivate enthusiasm and enjoyment	www.ncrel.org/sdrs/areas/issues/students/atrisk/at6lk69.htm
The PASS Program	Public middle and high schools	• Integrates positive aspects of sports culture into the curriculum • Self-paced learning	www.amersports.org/
The Arete School, San Rafael, CA	Tuition-free private K-12 school	• Mastery learning • Performance and team orientation • Character development	www.amersports.org/
Organized after-school programs	Public middle schools, programs funded by federal, state, and local monies	• Availability of sports, arts, and academic enrichment activities • Combination of peer interaction and adult supervision	www.afterschool.gov/ www.ed.gov/programs/21stcclc/index.html
Selected Danish Schools	Public primary schools	• Emphasis on autonomy, independence, intrinsic motivation, and alternative evaluations	www.legolearning.net/eng/default.asp?menu=papers&pagename=papers
Selected Japanese Schools	Public elementary and special afternoon schools	• Intermingled instructional methods and technologies • Development of knowledge and competence through creativity and innovation	www.legolearning.net/eng/default.asp?menu=papers&pagename=papers
Selected Finnish Schools	Public primary schools	• Combination of superior training in basic skills with collaboration and flexible curriculum • Integrates scholastic demands with playful, creative and cooperative activities • Academic breaks including frequent exercise	www.legolearning.net/eng/default.asp?menu=papers&pagename=papers

the implications of learning through immersion in these virtual learning environments since the emotional composition of these experiences resemble the flow state and precipitate a deeper engagement with learning.

Teacher's Flow and Group Flow

Several researchers have explored the teacher's flow experience while in classrooms. Di Bianca (2000) conducted an ESM study on both students and teachers in a limited sample of mathematics classrooms, and reported that students were *not* in flow when teachers were in flow, and vice-versa. One hypothesis may be the issue of control, that is, when teachers were in control of instruction, they were in flow but students were not; the reverse may have been true when students had more

control. More recently, however, when teachers have been asked to identify the cause of their flow experiences, they have frequently reported that students' engagement caused their flow to occur (Basom & Frase, 2004). When in the flow state, teachers report feeling connected to their class; they maintain good eye contact and can sense the attentiveness of the class. One recent study of 178 music teachers and 605 students in 16 schools specifically tested the hypothesis that flow experiences can "crossover" from teachers to their students (Bakker, 2005) and found that flow between teachers and students was indeed positively related.

Implications for Promoting Student Engagement

Several implications for practice may be derived from our analysis of flow as related to student engagement and learning. Although there has not been a great deal of engagement or flow found in U.S. public schools, factors such as student perceptions, instructional formats and school subjects, personality traits, and teacher characteristics all influence student engagement. Almost all of the research available tends to converge on the observation that meaningful engagement is composed of two independent processes—academic intensity and a positive emotional response—and that optimal learning environments combine both in order to make learning both playful and challenging, both spontaneous and important (e.g., Andersen, 2005a; Rathunde & Csikszentmihalyi, 2005a; Shernoff et al., 2003; Turner & Meyer, 2004). Other principles distilled from the empirical research suggest distinctive avenues to promote engagement and positive psychology in the schools. For example, students appear to be meaningfully engaged in learning activities when they are structured more like non-academic classes (Shernoff et al., 2003) and after-school enrichment activities are in place (Shernoff & Vandell, 2007). These structures may promote autonomy and initiative, as well as the opportunity to interact with peers and adult supervision. Some innovative, non-traditional schools are concrete examples that students' sense of belongingness, autonomy, equal relationships with staff, and the right to self-governance, can go a long way towards creating optimal learning environments (Johnson, 2004). Other research suggests that utilizing the model of a positive sports culture (Griffin, 1997) and providing opportunities for physical activity during the school day can be an extremely effective strategy to reach and engage many students, particularly the athletically inclined. Some budding research suggests that new technologies that have "presence" or the ability to "envelop" the learner in a virtual learning environment can be extremely flow-inducing (Pearce, 2005; Scoresby & Shelton, 2007). Finally, the flow of teachers can be contagious, having the potential to crossover into the flow of students (Bakker, 2005; Basom & Frase, 2004).

Using the flow model, researchers have discovered that creating engaged learners and optimal learning environments requires attention to a variety of contextual, instructional, developmental, and interpersonal factors beyond the preoccupation with educational "outcomes" narrowly defined. Nevertheless, a number of examples are beginning to demonstrate that schools need only the vision, initiative, and commitment to create environments where learning is enjoyable as well as rigorous for flow in schools to become a reality.

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