School Psychology Quarterly, Vol. 18, No. 2, 2003, pp. 158–176

Student Engagement in High School Classrooms from the Perspective of Flow Theory

David J. Shernoff
Northern Illinois University

Mihaly Csikszentmihalyi
Claremont Graduate University

Barbara Schneider
University of Chicago

Elisa Steele Shernoff
University of Wisconsin—Madison

We present a conceptualization of student engagement based on the culmination of concentration, interest, and enjoyment (i.e., flow). Using a longitudinal sample of 526 high school students across the U.S., we investigated how adolescents spent their time in high school and the conditions under which they reported being engaged. Participants experienced increased engagement when the perceived challenge of the task and their own skills were high and in balance, the instruction was relevant, and the learning environment was under their control. Participants were also more engaged in individual and group work versus listening to lectures, watching videos, or taking exams. Suggestions to increase engagement, such as focusing on learning activities that support students' autonomy and provide an appropriate level of challenge for students' skills, conclude the article.

School psychologists are rightfully concerned with some of the more stubborn and persistent educational problems facing students today. Such problems include underachievement as well as learning, behavioral, and emotional difficulties that eventually lead to school dropout for many students (Battin-Pearson et al., 2000). Dropping out of school is theorized to be a gradual process of student disengagement and alienation, marked by a chronic cycle of tardiness, absen-

This article was reviewed and accepted for publication under the Editorship of Terry B. Gutkin.
Address correspondence to David Jordan Shernoff, Ph.D, Northern Illinois University, Department of Educational Psychology and Foundations, Graham Hall, Dekalb, IL 60115. E-mail: shernoff@facstaff.wisc.edu.

teeism, failing classes, suspensions, and transitions between schools (Finn, 1989). Nevertheless, even among students who finish the required years of schooling, some research has found high rates of boredom, alienation, and disconnection with schooling (Larson & Richards, 1991). Studies have characterized high school students, in particular, as bored, staring out classroom windows, counting the seconds for the bell to ring, and pervasively disengaged from the learning process (Goodlad, 1984). According to a recent study on student engagement by Steinberg, Brown, and Dornbusch (1996), 50% of students reported that their classes were boring, and up to one-third reported that they survived their school day by "goofing off" with their friends.

However, students do not experience alienation and disconnection during all encounters with learning. Certain conditions may promote excitement, stimulation, and engagement in the learning process. In this article, we focus on student engagement within the framework of flow theory (Csikszentmihalyi, 1990). This study focuses on how students spend their time in high school classrooms, and the conditions under which they become more engaged in learning.

RESEARCH ON STUDENT ENGAGEMENT

In recent years, there has been growing awareness of the importance of student engagement for learning and achievement (e.g., Newmann, 1992; Steinberg, Brown, & Dornbusch, 1996). The likelihood of successful school completion is maximized by student involvement and participation with the schooling process that fosters a sense of commitment and belongingness (Christenson, Sinclair, Lahr, & Godber, 2001). We focus particularly on the phenomenological aspect of high involvement in classrooms, which includes concentrated attention, interest, and enjoyment as opposed to apathy and lack of interest with instruction (Newmann, Wehlage, & Lamborn, 1992). High engagement during tasks in high school classrooms has been a significant predictor of continuing motivation and commitment as well as overall performance in college (Shernoff & Hoogstra, 2001). Student engagement is influenced by a variety of aspects such as the following:

Phenomenological factors: Research suggests that student engagement may be influenced by several phenomenological factors, including the relevance of instruction and perceived control. With respect to instructional relevance, students are more likely to become engaged with authentic academic work that intellectually involves them in a process of meaningful inquiry to solve real life problems that extend beyond the classroom (Newmann, Wehledge, & Lamborn, 1992). Student engagement has also been related to how much control students have over their learning activities and positive emotions in the classroom (Deci, Nezlek, & Sheinman, 1981).

Instructional and teacher factors: Student engagement may also be affected by contextual and classroom factors, such as instructional format and school subject. With respect to the former, lecture recitation is among the most common teaching formats, in which control remains with the teacher. However, research by Grannis (1978) and Stodolsky (1988) indicates that students are more engaged in student-controlled versus teacher-controlled learning activities. A useful distinction to make is that whole group instruction tends to be perceived by students as relatively teacher-controlled, whereas small group and individual instruction are perceived as relatively student-controlled (Marks, 2000). In addition, exams and other external evaluations that emphasize social comparisons also appear to have negative consequences on students' interest and engagement (Boggiano, Main, & Katz, 1988).

Demographic factors and learning history: Various studies have found student engagement to be mediated by individual factors. For example, females report being more engaged in classrooms than males (Finn & Cox, 1992) and sixth and eighth graders were more engaged than tenth and 12th graders (Yair, 2000). One individual factor that has been found to influence engagement positively is reinforcement history, or the degree to which on-task behavior has been rewarded or praised in the past (Martens, Bradley, & Eckert, 1997). It should be noted, however, that the effect sizes corresponding to demographic differences and previous learning history are small in comparison with instructional and classroom factors (Marks, 2000; Shernoff, Schneider, & Csikszentmihalyi, 2001).

FLOW THEORY

Flow is a state of deep absorption in an activity that is intrinsically enjoyable, as when artists or athletes are focused on their play or performance (Csikszentmihalyi, 1990). Individuals in this state perceive their performance to be pleasurable and successful, and the activity is perceived as worth doing for its own sake, even if no further goal is reached (Nakamura & Csikszentmihalyi, 2002). The individual functions at his or her fullest capacity, and the experience itself becomes its own reward (DeCharms, 1968; Deci, 1975). Highly creative artists and scholars have reported the experience of flow when engaged in their best work (Csikszentmihalyi, 1996).

Flow theory is based on a symbiotic relationship between challenges and skills needed to meet those challenges. The flow experience is believed to occur when one's skills are neither overmatched nor underutilized to meet a given challenge. This balance of challenge and skill is fragile; when disrupted, apathy (i.e., low challenges, low skills), anxiety (i.e., high challenges, low skills), or relaxation (i.e., low challenges, high skills) are likely to be experienced (Csikszentmihalyi, 1997). The experience of anxiety or relaxation may prompt an instructor to change the level of challenge, and also prompt the student to increase his or her skill level in order to reenter flow. Issuing appropriate challenges and providing opportunities to enhance skills (e.g., providing immediate feedback and incrementally teaching more complex skills that build upon previously learned skills) may be one of the most ideal ways of engaging students.

Because the flow state is intrinsically rewarding, individuals seek to replicate flow experiences. This introduces a selective mechanism into psychological functioning that fosters growth (Nakamura & Csikszentmihalyi, 2002). As individuals seek to master new challenges, they develop greater levels of skill. Once mastered, they must identify progressively more complex challenges to create an ideal match for their skills. Flow thereby invokes a growth principle, in which a more complex set of capacities is sought after and developed.

Flow and Student Engagement

Based on flow theory, concentration, interest and enjoyment in an activity must be experienced simultaneously in order for flow to occur (Csikszentmihalyi, 1997). While our study combines these variables into an engagement composite score, each variable is an important component of flow theory and will be reviewed briefly.

Concentration. Flow experiences are described as states of intense concentration or absolute absorption in an activity (Csikszentmihalyi, 1990). In educational contexts, deep absorption in activities has been shown to promote optimal learning experiences. For example, Csikszentmihalyi, Rathunde, and Whalen (1993) reported that a sample of talented teenagers concentrated more than their average peers during classroom and study activities, but comparatively less while watching television and engaging in social activities. This finding suggests that the ability to harness concentration for more complex mental tasks may be one of the hallmarks of achievement and talent development.

Interest. Interest in an activity is a fundamental aspect of flow experiences, setting the foundation for continuing motivation and subsequent learning. Researchers have argued that interest provides the basis for becoming engaged with a topic for its own sake (Deci & Ryan, 1987). Acting on intrinsic interest alone, individuals seize opportunities to learn, read, work with others, and gain feedback in a way that supports their curiosity and serves as a bridge to more complex tasks.

Enjoyment. Flow activities, including intellectually demanding tasks, can also be enjoyable and satisfying. They may provide a feeling of creative accomplishment and satisfaction. Such feelings may occur mainly in retrospect because all concentration is focused on the task during actual engagement (Csikszentmihalyi, 1990). In any event, individuals who have developed their talent and creativity are those who continue to follow their sense of enjoyment in chosen activities (Csikszentmihalyi, 1996).

Rationale and Research Questions

Most of what is known about motivation and instruction is derived from research using experimental designs (see Stipek, 1996). Because classrooms are settings in which students largely participate in compulsory activities, measures that have been developed under experimental conditions may have limited applicability when investigating participation in free-choice (i.e., student-selected) activities. Therefore, more ecologically valid measures have been recommended (Brophy, 1983). Moreover, few studies have examined the experience of flow in the classroom setting. Given these limitations, the present study investigates the theory of flow in classrooms and whether learning situations featuring high challenges matched with high skills were associated with high engagement. Three research questions were investigated: (1) How do high school students spend their time in school? (2) What is the association between student engagement and the experience of challenge, skill, control, and relevance? and (3) How do classroom factors, such as instructional method and school subject matter influence student engagement?

METHOD

Participants

This study is based on data from the Sloan Study of Youth and Social Development (SSYSD), a national longitudinal study that investigates how students think about their lives in relationship to the future (Csikszentmihalyi & Schneider, 2000). These data were collected in three waves: 1992–1993 (Year 1), 1994–1995 (Year 3), and 1996–1997 (Year 5). Twelve research sites across the U.S. were selected for the study. Sites were widely distributed geographically and differed in level of urbanization, racial and ethnic composition, labor force composition, and economic stability. Data were collected from at least one elementary, middle, and secondary school in each site. A total of 13 high schools were sampled (one in each of the 11 sites, and two in the 12th site).

Students in grades six, eight, ten, and twelve were randomly selected from school-prepared enrollment lists and stratified by gender, race, ethnicity, and academic performance. This study selectively utilized a high school subsample of the SSYSD (i.e., grades 10–12); classrooms in elementary and middle schools were regarded as inappropriate to include when considering the effect of contextual factors such as school subject (e.g., vocational education). For each participant, only data collected in a single year were analyzed. To maximize the high school sample, we selected 12th-grade students (n = 168) in Year 1 of the study, tenth-grade students (n = 138) and 12th-grade students (n = 120) in Year 3 of the study, and tenth-grade students (n = 100) in Year 5 of the study. Thus, the sample consisted of 526 students from three separate cohorts in the 1990s. Sixty-two percent of the sample was female and 34% was male. Sixteen percent of the sample was African American, 8% was Asian American, 10% was Latino, and 64% was European American. The breakdown of race/ethnicity does not total 100% due to missing data. By averaging indexes on parental education and status of parental occupation, socioeconomic status of participants' families was as follows: 7% were low income, 15% were lower-middle income, 37% were middle income, 27% were upper-middle income, and 14% were upper income. A response bias occurred under-representing males, Latinos, and students from low income families when compared to national demographics. Care must be taken to interpret results of this study with these response biases in mind. (For further details concerning the sampling design and procedures of the full-scale study, see Csikszentmihalyi and Schneider, 2000).

Instrumentation

Experience Sampling Method (ESM). The ESM measures participants' location, activity, and affective and cognitive experiences at random moments. It is particularly valuable for eliciting the subjective experiences of persons interacting in their natural environments. Previous research has demonstrated ESM as both reliable and valid (See Csikszentmihalyi & Larson, 1987; Moneta & Csikszentmihalyi, 1996).

After being signaled by an electronic pager, participants took several minutes to complete an Experience Sampling Form (ESF). The ESF contained approximately 45 items on two sides of a single page. The first four items were open-ended questions asking participants to report their location, their thoughts, and the primary and secondary activities in which they were engaged. Participants next reported their perceptions about the activity with which they were engaged using Likert-type response scales ranging either from 0 (low) to 9 (high) or 1 (low) to 9 (high). Participants also answered several items about their feeling states for mood on a 7-point semantic differential scales (e.g., happy–sad, strong–weak). Participants carried ESF logbooks for the week sampled, with each logbook containing enough ESFs for students to respond to eight signals each day of the week. Further details regarding ESM procedures can be found in Csikszentmihalyi and Schneider (2000).

Dependent Measures

Student engagement. The primary measure of student engagement was derived from three items on the ESF that assessed concentration ("How well were you concentrating?"), interest ("Did you find the activity interesting?") and enjoyment in an activity ("Did you enjoy what you were doing?"). A composite engagement score averaged these three variables because the simultaneous experience of concentration, interest, and enjoyment is the central phenomenological feature of flow experiences. High levels of concentration, enjoyment, and interest were not routinely experienced together ($\alpha = .47$ in this study), but flow theory would predict that identifying contexts in which they are experienced simultaneously may hold an important key to understanding student engagement. Nevertheless, given the moderate internal consistency of the global indicator, each component of engagement was tested and reported separately.

Attention. A dichotomous measure of attention was based on the ESF item, "What were you thinking while you were beeped?" Responses were coded as either academic or nonacademic thoughts while engaged in different classroom activities. Academic thoughts included thinking about a school subject (e.g., math), an activity (e.g., taking notes), or other thoughts related to schooling. Nonacademic thoughts included those related to oneself, friends, romantic interests, eating, going home, or nothing at all.

Quality of experience factors. Participants rated the quality of their subjective experience at the time that they were beeped on the Likert-type scales. These ratings were made on 25 separate items on the ESF. A subsequent factor analysis was performed on these 25 items to provide a more parsimonious interpretation of the results. Four factors were identified with eigenvalues over 1.4. The first factor was Mood (e.g., participants' overall emotional state) with top loading components including: active (l_1 = .78), sociable (l_1 = .76), strong (l_1 = .74), happy (l_1 = .70), and proud (l_1 = .69). The second derived factor was Esteem (e.g., self-assessment of worth, ability, accomplishments, success in meeting expectations, and control during classroom situations), with top loading components including: meeting expectations of self (l_2 = .76), succeeding (l_2 = .68), meeting expectations of others (l_2 = .65), control (l_2 = .61), skill (l_2= .60), and feeling good about self (l_2 = .60). The third factor was Academic Intensity (e.g., the challenge and importance found in classroom activities and the amount of concentration demanded), with top loading components including: challenge (l_3 = .86), easy (l_3 = –.83), importance to future goals (l_3 = .66), concentration (l_3 = .57), and importance to self (l_3 = .55). Finally, the fourth factor was Intrinsic Motivation (e.g., interest, enjoyment, and desire to engage in an activity), with top loading components including: interest (l_4 = 79), wish doing something else (l_4 = –.75), and enjoyment (l_4 = .71). The items comprising each derived factor were combined to form a composite variable, with alphas for the factors ranging from .77 (Intrinsic Motivation) to .85 (Mood).

Independent Measures

Challenge, skill, and the challenge/skill conditions. Measures of challenge and skill were derived from responses to the request, "Indicate how you felt about the main activity." From this request, participants then rated their perceived challenge of the activity and the skills necessary to complete the activity. Based on flow theory, four challenge/skill conditions were then created: (a) apathy (i.e., low challenge, low skill); (b) relaxation (i.e., low challenge, high skill); (c) anxiety (i.e., high challenge, low skill), and (d) flow (i.e., high challenge, high skill).

Instructional relevance and control. The measure of perceived relevance averaged responses to the questions: "Was this activity important to you?" and "How important was it in relation to your future goals?" (r = .60). Perceived control was measured from the question "Did you feel in control of the situation?" Choices ranged from 0 (low) to 9 (high).

Measures of classroom activities and school subject. When signaled, students provided responses to the open-ended ESF question, "What was the main thing you were doing as you were signaled?" Although there was a wide range of responses provided, the most frequent classroom activities were individual work (n = 406); listening to a lecture (n = 381); taking exams (n = 225); watching television, films, or videos (n = 128); and group work (n = 103), which combines group work and lab activities. In this case n refers to the number of ESFs submitted in a particular activity, not the number of participants engaged in the activity. Because participants were beeped randomly, duration of engagement in each activity (both in total and before the student was beeped) was not known but varied randomly. The coded response on the ESF question, "Where were you as you were signaled?" was used to determine which school subject students were attending as they were signaled. The most commonly reported subjects were English (n = 697), math (n = 571), science (n = 614), history (n = 220), foreign language (n = 353), social science (n = 377), computer science (n = 96), art (n = 295), and vocational education (n = 241), which were analyzed in this study.[1]

Procedure

To implement the ESM, pre-programmed wristwatches randomly signaled participants eight times daily at different intervals from 7:30 a.m. through 10:30 p.m. over the course of one 7-day week. Participants completed the ESF each time they were signaled.[2] In our sample of 526 students, we analyzed 3,630 responses that occurred in a classroom context, which averaged to 6.9 responses per student. ESM data were coded by trained coders using a detailed coding scheme. Inter-coder agreement was computed using Cohen's Kappa, which ranged between .86 and .97 for all codes.

Analyses of ESM Data

Time use. To estimate time use in classrooms, we calculated the percentage of beeps reported in one activity compared to total beeps in all possible activities of interest (e.g., 250 beeps reported while in one type of class activity out of a total of 1,000 beeps reported in all class activities equals 25%).

Z scores. To estimate a participant's overall level of engagement in class-

[1]The following combinations of class types were constructed in order to derive the classifications of school subjects. English combines English, English composition, literature, and reading. Science combines general science, biology, chemistry, physics, and earth science. Social science/studies combines political science, civics, geography, world culture, psychology, social studies, sociology, anthropology, and ethnic/multicultural studies. Computer Science combines computer science and programming. Art combines music, fine art, photography, drafting, graphics, applied art, and drama. Vocational Education combines agriculture, shop, vo-tech, domestic arts, home economics, business skills, and career exploration/counseling. N refers to the number of ESFs submitted during each school subject, not the number of participants in each subject.

[2]Signaling participants after school and on the weekend was considered important to compare the quality of classroom experiences in various contexts with a variety of contexts outside of school (e.g., under what conditions are students in classrooms as engaged as when in activities outside of classrooms?).

rooms and in subsequent analyses, raw ESM scores were analyzed as well as their conversion into *z* scores. The standardized *z* scores are measured relative to each student's individual experience throughout the week, (i.e., a score of 0 on a variable would be considered as average enjoyment in a given context, while a score of –1 indicates the student's level of enjoyment is one *SD* below his or her average). In this regard, *z* scores are more sensitive to the effect of context on students' quality of experience. This sensitivity was considered desirable for a study of classroom contextual factors on student engagement.

Statistical tests. Because all ESM scores were treated as independent variables, one-way ANOVAs were used as the primary statistical test, with Duncan's Multiple Range Test serving as the post-hoc statisitic for significant results. *T*-tests and chi-square analyses were also utilized. For analyzing the effects of the four challenge/skill conditions (i.e., apathy, anxiety, relaxation, and flow), "high" challenge and "high" skill was defined as *z* scores on each variable over 0 (i.e., experiences in which challenge was above each individual's own mean), and "low" challenge and "low" skill was defined as *z* scores less than 0 (i.e., experiences in which challenge and skill were below each individual's own mean). This method is the most common way of defining high versus low challenge and skills for the purpose of creating challenge/skill conditions associated with flow theory (e.g., Massimini & Carli, 1988).

RESULTS

How Students Spent Their Time in High School Classes

The two highest percentage activities in which students were engaged were individual work (23%) and listening to lectures (21%). When combined with taking notes (10%), and doing homework or studying (7%), the majority of students' instructional time largely involved noninteractive activities. Students also spent 13% of their time taking exams and 7% of their time watching television or a video. Beyond these major spheres of classroom activity, small amounts of time were spent more interactively, in discussion (9%) and group or lab work (6%). Little time was spent talking with the teacher individually (1%). The remaining 4% was spent on other activities, such as watching demonstrations and giving presentations.

Phenomenological Influences on Student Engagement

Relationship between challenge/skill conditions and engagement. *T*-tests were first conducted with the challenge and skill items split at the median (i.e., high vs. low) and used as the grouping variable (challenge, $Mdn = .36$, $N = 3487$; skill, $Mdn = .14$, $N = 3469$).[3] The perception of high challenge was associated with higher engagement than the perception of low challenge, $t(3418) = 9.83$, $p < .001$.

[3]*N* refers to the number of beeps or experiences, not individuals.

Further, when students perceived their skill level as high, they also reported higher engagement $t(3410) = 10.89$, $p < .001$. In addition to the separate effects of challenge and skill on engagement, flow theory contends that the combination of challenge and skill would differently influence engagement as well. Thus, average z scores across the four challenge/skill conditions (i.e., apathy, relaxation, anxiety, and flow) were compared. Table 1 presents the results of an ANOVA performed on all dependent measures. Results revealed a significant main effect for the engagement composite score $F(3, 3401) = 83.12$, $p < .001$. The highest level of engagement was reported in the flow condition, while students reported being the least engaged in the apathy condition. Significant main effects were also obtained for the subcomponents of engagement: interest $F(3, 3467) = 52.71$, $p < .001$, concentration $F(3, 3467) = 144.29$, $p < .001$, and enjoyment $F(3, 3467) = 49.91$, $p < .001$. With the exception of the enjoyment z score during flow and relaxation (which were not significantly different), students participating in activities that contained high challenges but also required higher developed skills also reported greater interest, concentration, and enjoyment in the activity.

Relationship challenge/skill conditions on attention. Similar patterns emerged when examining the effect of the challenge/skill conditions on students' attention. Given that the attention variable was dichotomously scored, a cross-tabulation of attention with the four challenge/skill conditions was compared. The effect of the challenge/skill conditions on attention was significant, $\chi^2(3, N = 3417) = 229.57$, $p < .001$. In the flow condition, participants reported attending to instruction 73% of the time, as opposed to the apathy condition (i.e., challenge and skills are low), when participants were attending to instruction approximately 42% of the time. In the anxiety and relaxation conditions, participants reported attending to instruction 70% and 58%, respectively.

Relationship of challenge/skill conditions on quality of experience. Chal-

TABLE 1. The Interaction of Challenge and Skill on Student Engagement and Quality of Experience in High School Classrooms (*Z* Score Means)

	Apathy	Relaxation	Anxiety	Flow	χ^2/F-test
Engagement	$-.329^a$	$-.091^b$	$-.124^b$	$.223^c$	83.12***
Interest	$-.332^a$	$-.083^b$	$-.149^b$	$.239^c$	52.71***
Concentration	$-.291^a$	$-.080^b$	$.363^c$	$.558^d$	144.29***
Enjoyment	$-.371^b$	$-.108^c$	$-.583^a$	$-.135^c$	49.91***
Attention	42%	49.7%	69.9%	73.1%	229.57***
Mood	$-.234^a$	$-.030^b$	$-.220^a$	$.140^c$	28.61***
Esteem	$-.330^b$	$.124^c$	$-.391^a$	$.148^c$	181.48***
Intensity	$-.261^a$	$-.179^b$	$.405^c$	$.510^d$	555.84***
Motivation	$-.372^a$	$-.146^b$	$-.443^a$	$-.041^c$	52.34***

Note. Within each row, superscripts denote statistically separate categories according to Duncan's multiple range test (d > c > b > a). Apathy = low challenge and low skill, Relaxation = low challenge and high skill, Anxiety = high challenge and low skill, Flow = high challenge and high skill. Sample sizes reflect the number of ESM responses, not individuals, in each activity.

lenge/skill conditions also appeared to exert a strong influence on other measures of students' quality of experience, including mood $F(3, 3467) = 28.61$, $p < .001$, esteem $F(3, 3467) = 181.48$, $p < .001$, intensity $F(3, 3467) = 555.84$, $p < .001$, and motivation $F(3, 3467) = 52.34$, $p < .001$. All measures of students' quality of experience were reported to be highest in the flow condition and lowest in the apathy condition, with the exception of esteem, where experiences in the relaxation condition were not significantly different than students in the flow condition.

The effect of control and relevance on quality of experience. The effect of perceived control and relevance on engagement were also examined, with the median split for each variable serving to distinguish the "high" and "low" categories (control, $Mdn = -.21$, $N = 3483$; relevance, $Mdn = 10$, $N = 3455$). Students reported feeling significantly more engaged $t(3407) = 13.74$, $p < .001$, and experiencing higher esteem $t(3361) = 28.23$, $p < .001$, and mood $t(3226) = 14.78$, $p < .001$, when experiencing high versus low control over situations. Students also reported higher engagement $t(3406) = 19.57$, $p < .001$ when instruction was perceived as having high versus low relevance. The perception of high relevance was also associated with higher academic intensity $t(3443) = 47.17$, $p < .001$.

Relationship of instructional method factors on engagement. Table 2 presents the results of a one-way ANOVA performed on engagement during the five different classroom activities. There was a significant effect of instructional method on engagement $F(4, 1238) = 6.48$, $p < .001$. Students reported higher engagement during group work and individual work than while taking exams, watching television or videos, or listening to lectures. Significant effects were also noted for all subcomponents of engagement: interest $F(4, 1238) = 5.21$, $p <$

TABLE 2. Means and ANOVA Results for Engagement and Quality of Experience in Five Common Classroom Activities

Variable	Lecture	TV/Video	Exam	Individual work	Group work	χ^2/F-test
Engagement	5.34^a	5.44^a	5.54^a	5.98^b	6.18^b	6.48***
Interest	4.60^a	4.80^b	4.20^a	4.94^{bc}	5.46^c	5.21***
Concentration	6.49^b	5.89^a	8.48^d	7.43^c	7.34^c	33.98***
Enjoyment	4.90^b	5.59^c	3.95^a	5.55^c	5.84^c	14.73***
Attention	65.3%	57.1%	83.0%	77.9%	75.2%	43.49***
Mood	4.11^a	4.30^{ab}	4.41^{bc}	4.59^{cd}	4.66^d	13.48***
Esteem	6.57^a	6.66^{ab}	6.94^{ab}	6.90^{ab}	7.04^b	2.92*
Intensity	5.05^b	3.86^a	6.63^d	5.78^c	5.67^c	56.93***
Motivation	4.19^b	4.51^{bc}	3.58^a	4.59^{bc}	4.86^c	9.96***
N	381	128	225	406	103	–

Note. Within each row, superscripts denote statistically separate categories according to Duncan's multiple range test (d > c > b > a). Sample sizes reflect the number of ESM responses, not individuals, in each activity. The maximum score was 9.

.001, concentration $F(4, 1238) = 33.98$, $p < .001$, and enjoyment $F(4, 1238) = 14.73$, $p < .001$. As with the engagement composite score, students reported higher interest in individual and group work activities (although interest in television/video instruction was comparably high as well). As expected, concentration was highest during examinations, but was also significantly higher for individual and group work activities than lecture and television/video instruction. Finally, higher enjoyment ratings were provided during television/video instruction, and individual and group work activities than lecture activities and examinations.

Relationship of instructional method on attention. A cross-tabulation of attention and the five instructional methods also yielded a significant effect, χ^2 (3, $N = 1238$) = 43.49, $p < .001$. Students reported paying attention 83% of the time when taking exams, 78% of the time during individual work, and 75% of the time during group work. By comparison, they were paying attention less frequently while listening to the teacher lecture (65%) and while watching TV or a video (57%).

Relationship of instructional method on quality of experience. Table 2 also presents ANOVA results comparing several experiential measures across the same activities. There was a significant effect of instructional method on mood $F(4, 1207) = 13.48$, $p < .001$, esteem $F(4, 1207) = 2.92$, $p < .05$, intensity $F(4, 1207) = 56.93$, $p < .001$, and motivation $F(4, 1204) = 9.96$, $p < .001$. Students reported a higher quality of experience on all measures during individual and group work versus listening to lectures. When taking exams, students reported the highest level of academic intensity but the lowest level of motivation compared to other activities. On the other hand, students reported relatively high motivation, but low intensity, while watching television or videos. Individual or group work activities corresponded to the highest mood level, and also corresponded to high motivation.

School Subject Factors

Relationship of school subject on engagement. Results from a series of one-way ANOVAs (see Table 3) revealed a significant effect of school subject on the engagement composite $F(8, 3332) = 6.49$, $p < .001$. Students reported the highest level of engagement in art and computer science, followed by vocational education and social studies. Thus, for the most part students reported being more engaged in their nonacademic subjects (i.e., computer science, art, and vocational education) than in their academic subjects. Significant differences were also obtained for the sub-engagement components interest $F(8, 3332) = 4.81$, $p < .001$ and enjoyment $F(8, 3332) = 16.39$, $p < .001$, but not concentration $F(8, 3332) = 0.78$. Significantly higher interest and enjoyment scores were reported during computer science and art than other school subjects.

Relationship of school subject on attention. A cross-tabulation of attention and school subject also yielded significant results, χ^2 (3, $N = 3332$) = 29.85, $p <$

TABLE 3. Means and ANOVAs for Student Engagement and Quality of Experience in School Subjects

Variable	Math	English	Science	Foreign Language	History	Social Studies	Computer Science	Art	Vocational Education	χ^2/F-test
Engagement	5.35^{a}	5.64^{ab}	5.62^{ab}	5.55^{ab}	5.39^{ab}	5.74^{abc}	6.05^{cd}	6.35^{d}	5.89^{bc}	6.49***
Interest	4.43^{a}	4.79^{abc}	4.74^{abc}	4.53^{ab}	4.56^{ab}	4.99^{bc}	5.10^{cd}	5.47^{d}	4.81^{abc}	4.81***
Concentration	6.65^{a}	6.52^{a}	6.72^{a}	6.74^{a}	6.70^{a}	6.38^{a}	6.71^{a}	6.56^{a}	6.75^{a}	.78
Enjoyment	4.92^{a}	5.60^{bc}	5.37^{ab}	5.34^{ab}	4.92^{a}	5.87^{bcd}	6.24^{d}	6.99^{a}	6.11^{cd}	16.39***
Attention	65.2%	56.7%	65.0%	63.8%	57.6%	52.8%	64.6%	56.0%	58.2%	29.85***
Mood	4.36^{a}	4.43^{a}	4.32^{a}	4.44^{a}	4.27^{a}	4.48^{ab}	4.64^{b}	4.72^{c}	4.65^{bc}	4.70***
Esteem	6.62^{ab}	6.74^{abc}	6.68^{abc}	6.70^{abc}	6.60^{a}	6.80^{abc}	6.83^{abc}	6.96^{bc}	6.99^{c}	1.80
Intensity	5.53^{c}	4.81^{a}	5.16^{ab}	5.01^{ab}	4.98^{ab}	4.82^{a}	5.27^{bc}	5.09^{ab}	4.84^{a}	6.21***
Motivation	4.16^{a}	4.56^{abc}	4.46^{ab}	4.32^{a}	4.22^{a}	4.80^{bc}	4.84^{bc}	5.47^{d}	4.92^{c}	10.80***
N	571	697	614	353	220	377	96	295	241	–

Note. Within each row, superscripts denote statistically separate categories according to Duncan's multiple range test (d > c > b > a). Sample sizes reflect the number of ESM responses, not individuals, in each activity. The maximum score was 9.

.001. Students reported paying attention most frequently in math (65%), science (65%), and computer science class (65%), and least frequently in history (58%), English (57%), and social studies (53%).

Relationship of school subject on quality of experience. School subject also exerted a significant effect on mood $F(8, 3332) = 4.70$, $p < .001$, intensity $F(8, 3332) = 6.21$, $p < .001$, $p < .001$ and motivation $F(8, 3332) = 10.80$, $p < .001$. Students reported that participating in art classes increased their mood and motivation more than participating in other courses, but it was not an intense subject. Conversely, math and computer science classes were reported as being the most intense but not necessarily the most motivating subjects for students. Although the distribution of mean scores across subjects precludes any simple interpretation of the pattern of scores, students in general reported their academic classes to be more intense (i.e., challenging and important), but their nonacademic courses more intrinsically motivating.

DISCUSSION

Data obtained from this study yielded a number of interesting findings. The results showed that students spend approximately one-third of their time passively attending to information transmitted to the entire class (i.e., listening to a lecture, watching television or a video). More than half of their instruction time was spent on independent work that was somewhat active, structured, or intellectually challenging for at least some of the time (e.g., individual work, taking an exam, studying or doing homework, or listening and taking notes). Approximately 14% of students' time in class was spent in more interactive activities, such as class discussions and group activities. The abundance of lectures, taking notes, and watching videos makes for a narrow range of classroom activities that leaves little room for active engagement. An interesting question becomes how students can be expected to reach adult goals of participation, belongingness, and identification with school (Finn, 1989) when active and meaningful participation is not consistently invited in classrooms.

Phenomenological aspects of instruction appeared to have profound effects on students' engagement, particularly with respect to how the challenge of the activity and the skills needed to complete the activity are balanced. Perceived control and relevance of the activity were also noted as important contributors to engagement. These findings collectively suggest that student disengagement may stem from a lack of challenge or meaning, which was reported to typically occur in the lecture format (i.e., teacher-initiated instruction). Given the importance of challenge, skill, and relevance of instruction to overall engagement, teachers may be able to enhance engagement by supporting students' sense of competency and autonomy, such as providing tasks that offer choice, are connected to students' personal goals, and offer opportunities for success. However, it is important to emphasize that providing curricular tasks that are too easy does not appear to be an effective strategy for facilitating student engagement any more than giving students tasks that are too difficult. Optimal engagement appears to be promoted by a moderate difference between the challenge of a task and an individual's skills. Individuals naturally learn by mastering skills one step beyond one's current skills; nevertheless, the challenge for teachers is to provide tasks slightly too difficult to master at one's present skill level, but that can be mastered with the acquisition of new skills. Thus, engagement in many respects is akin to working within students' *zones of proximal development* (Rogoff, 1990) to ensure that engagement is first established and subsequently maintained.

Students reported being more engaged during individual and group work than while listening to a lecture, watching TV/video, or taking a test. Lecture recitation is among the most common teaching formats, and one in which the student is relatively anonymous and inactive. During lecture recitation, the locus of control remains firmly with the teacher; hence, lecture recitation may be viewed as both a formal and controlling mode of instruction in which the teacher dominates the classroom (Bidwell & Kasarda, 1980). Some research has indicated that the more teachers lecture, the fewer opportunities students have to become engaged and attempt to learn the material themselves (Mitchell, 1993). With respect to test taking, the low levels of enjoyment and interest that students reported while taking tests is consistent with research linking the expectation of taking an examination with decreases in intrinsic motivation (Benware & Deci, 1984). In contrast, numerous studies have documented positive effects of cooperative learning activities and group activities on students' interest, engagement with learning, and other motivational-related factors (see Johnson & Johnson, 1985). Despite the emphasis that has been placed on the benefits of cooperative learning activities (Slavin, 1983), this study suggests that individual work can be equally engaging as group work from the perspective of flow theory.

Perceptions of challenge and relevance are associated with students' concentration, interest, and attention. This association is referred to as academic intensity. Relatedly, perceptions of high competence and autonomy are associated with significant increases in mood, enjoyment, esteem, and intrinsic motivation. We refer to this association as positive emotional response. Both academic intensity and a positive emotional response appear to be integral parts of optimal engagement in classrooms. Many classroom activities and school subjects, however, appeal to students in terms of either creating academic intensity *or* positive emotional responses. For example, students reported that taking exams was challenging and demanded concentration, but was not necessarily enjoyable. Although students may understand the importance of their performance on tests, this emphasis on performance (which may lead to social comparison) may undermine intrinsic interest and enjoyment. Conversely, students reported high enjoyment when watching television and videos, but also reported that those activities were significantly lower in terms of concentration and intensity. Interestingly, listening to lectures appeared to lack academic intensity and did not provoke a positive emotional response. Other activities, such as individual and group work, frequently combined both aspects of engagement. Such instances were associated with a psychological state similar to flow experiences, in which concentration, enjoyment, and interest were all high.

Similar patterns with respect to academic intensity and positive emotional experiences were noted for certain school subjects and instructional activities. For example, students reported that math was one of the most academically intense experiences, rating it as the most challenging and relevant. However, students appeared to feel more negatively about math than other subjects. On the other hand, art, which was the subject participants expressed enjoying the most, was also reported to be the least relevant to participants and their future goals. In general, students reported nonacademic subjects as more engaging than academic ones, particularly in terms of positive emotions. Goodlad (1984) also found that high school students reported liking their nonacademic subjects more than their academic subjects. Computer science appeared to be a rare example of a subject that students reported to be academically intense as well as intrinsically motivating.

In summary, the results of the present study suggest that activities that are academically intense and foster positive emotions stand the best chance of engaging students. Ideally, teachers may develop activities that are experienced as challenging and relevant, yet also allow students to feel in control of their learning environment and confident in their ability. These are activities in which students concentrate, experience enjoyment, and are provided with immediate, intrinsic satisfaction that builds a foundation of interest for the future. Teachers succeeding in providing such engagement most likely consider not only the knowledge and skills to be learned, but also the students as learners, adapting instruction to their developmental levels and individual interests.

Limitations

Readers should bear in mind several important limitations of the study. First, this study relied on self-report data, which is ideal for studying students' subjective experiences but vulnerable to errors including problems with memory, hasty completion, exaggeration, and deliberate falsification. Second, some of the results may have been influenced by response bias (e.g., the underrepresentation of males and Latinos). Thus, there is increased concern that those who responded are somehow different from those who did not respond. Third, results from this study are mainly correlational, making inferences regarding causality speculative even if informed. Fourth, analyses performed on the beep level, while not substantially affecting the means reported, conflate the standard error of measurement, and thus the actual significance levels reported may be too high. Fifth, this study does not directly examine a critical influence on classroom engagement—the teacher—who is directly responsible for making instructional choices. Finally, this study did not take into account students' developmental levels, educational histories, specific learning skills, and expectations for success. All of these individual factors are undoubtedly important when selecting tasks conducive to engagement.

Suggestions for Future Research

A number of suggestions for future research emerge from this study. First, it would be desirable to know how the interaction of various task characteristics affects engagement. For example, would students feel engaged when assigned highly relevant tasks that are their choice but too easy or difficult? Second, ESM studies would be enhanced by observing teachers and students in classrooms systematically. Research relating to engagement of youth should also be expanded beyond school to include after school and weekend activities such as performing hobbies, engaging in social or leisure activities, or utilizing the Internet. Longitudinal designs that evaluate how motivation and engagement change over time and interact with developmental factors are greatly needed.

Although the principles of instruction suggested by this study are intuitively appealing and corroborate much previous research (Stipek, 1996), analyses regarding time use and instructional methods suggest that these principles are not easy to implement in the classroom. The model of instruction in which learning is expected to occur by transmitting information to the entire class is slow to change. It takes a great deal of skill, training, and experience to implement many of the suggested principles. Providing opportunities for interaction and participation appropriate for each student's ability level may be particularly challenging with students who have diverse interests and learning needs. However, providing instruction that engages students is a challenge worth achieving, and with the necessary instructional skills, can become a rewarding and flow-inducing experience that produces positive educational outcomes for learners.

REFERENCES

Battin-Pearson, S., Newcomb, M. D., Abbott, R. D., Hill, K. G., Catalano, R. F., & Hawkins, J. D. (2000). Predictors of early high school dropout: A test of five theories. *Journal of Educational Psychology, 92,* 568–582.

Benware, C. A., & Deci, E. L. (1984). Quality of learning with an active versus passive motivational set. *American Educational Research Journal, 21*(4), 755–765.

Bidwell, C. E., & Kasarda, J. D. (1980). Conceptualizing and measuring the effects of school and schooling. *American Journal of Education, 88,* 401–430.

Boggiano, A. K., Main, D. S., & Katz, P. A. (1988). Children's preference for challenge: The role of perceived competence and control. *Journal of Personality & Social Psychology, 54,* 134–141.

Brophy, J. E. (1983). Conceptualizing student motivation. *Educational Psychologist, 18*(3), 200–215.

Christenson, S. L., Sinclair, M. F., Lahr, C. A., & Godber, Y. (2001). Promoting successful school completion: Critical conceptual and methodological guidelines. *School Psychology Quarterly, 16*(4), 468–484.

Cothran, D. J., & Ennis, C. D. (2000). Building bridges to student engagement: communicating respect and care for students in urban high schools. *Journal of Research and Development in Education, 33*(2), 106–117.

Csikszentmihalyi, M. (1990). Flow: The psychology of optimal experience. New York: Harper-Perennial.

Csikszentmihalyi, M. (1996). *Creativity: Flow and the psychology of discovery and invention.* New York: HarperCollins.

Csikszentmihalyi, M. (1997). *Finding flow: The psychology of engagement with everyday life. The masterminds series.* New York: Basic Books.

Csikszentmihalyi, M., & Larson, R. (1987). Validity and reliability of the experience-sampling method. *Journal of Nervous & Mental Disease, 175,* 525–536.

Csikszentmihalyi, M., Rathunde, K., & Whalen, S. (1993). *Talented teenagers: The roots of success and failure.* New York: Cambridge University Press.

Csikszentmihalyi, M., & Schneider, B. (2000). *Becoming adult: How teenagers prepare for the world of work.* New York: Basic Books.

DeCharms, R. (1968). *Personal causation: The internal effective determinants of behavior.* New York: Academic Press.

Deci, E. L. (1975). *Intrinsic motivation.* New York: Plenum Press.

Deci, E. L., Nezlek, J., & Sheinman, L. (1981). Characteristics of the rewarder and intrinsic motivation of the rewardee. *Journal of Personality & Social Psychology, 40,* 1–10.

Deci, E. L., & Ryan, R. M. (1987). The support of autonomy and the control of behavior. *Journal of Personality & Social Psychology, 53,* 1024–1037.

Finn, J. D. (1989). Withdrawing from school. *Review of Educational Research, 59,* 117–142.

Finn, J. D., & Cox, D. (1992). Participation and withdrawal among fourth-grade pupils. *American Educational Research Journal, 29,* 141–162.

Goodlad, J. I. (1984). *A place called school: Prospects for the future.* New York: McGraw-Hill Book Co.

Grannis, J. C. (1978). Task engagement and the consistency of pedagogical controls: An ecological study of different structured classroom settings. *Curriculum Inquiry, 8,* 3–37.

Johnson, D., & Johnson, R. (1985). Motivational processes in cooperative, competitive, and individualistic learning situations. In C. Ames & R. Ames (Eds.), *Research on motivation in education: The classroom milieu* (Vol. 2, pp. 249–286). New York: Academic Press

Larson, R. W., & Richards, M. H. (1991). Boredom in the middle school years: Blaming schools versus blaming students. *American Journal of Education, 99,* 418–443.

Marks, H. M. (2000). Student engagement in instructional activity: Patterns in the elementary, middle and high school years. *American Educational Research Journal, 37,* 153–184.

Martens, B. K., Bradley, T. A., & Eckert, T. L. (1997). Effects of reinforcement history and instructions on the persistence of student engagement. *Journal of Applied Behavior Analysis, 30,* 569–572.

Massimini, F., & Carli, M. (1988). The systematic assessment of flow in daily experience. In M. Csikszentmihalyi & I. S. Csikszentmihalyi (Eds.), *Optimal experience: Psychological studies of flow in consciousness* (pp. 266–287). New York: Cambridge University Press.

Mitchell, M. (1993). Situational interest: Its multifaceted structure in the secondary school mathematics classroom. *Journal of Educational Psychology, 85*(3), 424–436.

Moneta, G. B., & Csikszentmihalyi, M. (1996). The effect of perceived challenges and skills on the quality of subjective experience. *Journal of Personality, 64,* 266–310.

Nakamura, J., & Csikszentmihalyi, M. (2002). The concept of flow. In C. R. Snyder & S. J. Lopez (Eds.), *Handbook of positive psychology* (pp. 89–105). Oxford: Oxford University Press.

Newmann, F. M. (Ed.). (1992). *Student engagement and achievement in American secondary schools.* New York: Teachers College Press Columbia University.

Newmann, F. M., Wehlage, G. G., & Lamborn, S. D. (1992). The significance and sources of student engagement. In F. M. Newmann (Ed.), *Student engagement and achievement in American secondary schools* (pp. 11–39). New York: Teachers College Press.

Rogoff, B. (1990). *Apprenticeship in thinking : Cognitive development in social context.* New York: Oxford University Press.

Shernoff, D. J., Schneider, B., & Csikszentmihalyi, M. (2001, April). *Assessing multiple influences on student engagement in high school classrooms.* Paper presented at the Annual Meeting of the American Educational Research Association, Seattle, WA.

Shernoff, D. J., & Hoogstra, L. (2001). Continuing motivation beyond the high school classroom. *New Directions in Child and Adolescent Development, 93,* 73–87.

Slavin, R. E. (1983). Cooperative learning. New York: Longman.

Steinberg, L. D., Brown, B. B., & Dornbusch, S. M. (1996). *Beyond the classroom : Why school reform has failed and what parents need to do.* New York: Simon & Schuster.

Stipek, D. J. (1996). Motivation and instruction. In D. C. Berliner & R. Calfee, (Eds.), *Handbook of educational psychology* (pp. 85–113). New York: Simon & Schuster Macmillan.

Stodolsky, S. S. (1988). *The subject matters: Classroom activity in math and social studies.* Chicago: University of Chicago Press.

Yair, G. (2000). Educational battlefields in America: The tug-of-war over students' engagement with instruction. *Sociology of Education, 73,* 247–269.

Action Editor: Richard Gilman
Acceptance Date: August 28, 2002

David J. Shernoff, Ph.D., is an Assistant Professor in the Department of Educational Psychology and Foundations at Northern Illinois University. His major research interests are student engagement and motivation, mentoring, and adolescent development. He is the author of *The Individual-Maker: A Master Teacher and his Transformational Curriculum.* He received his Ph.D. from the Department of Education at the University of Chicago.

Mihaly Csikszentmihalyi, Ph.D., is the Davidson Professor of Psychology at the Drucker Graduate School of Management at Claremont Graduate University and Director of the Quality of Life Research Center. He is also Emeritus Professor of Human Development at the University of Chicago. He is the author or co-author of 14 books and over 200 research articles, including *Becoming Adult* (2000), and most recently, *Good Work: When Excellence and Ethics Meet* (2001).

Dr. Barbara Schneider, Ph.D., is a Professor of Sociology and Human Development and Director of the Data Research and Development Center at the University of Chicago. Her major interests are in adolescent development and the social organization of schooling. Her latest book, co-authored with Tony Bryk, is *Trust in Schools: A Core Resource for School Improvement.*

Elisa Steele Shernoff is a doctoral student in Educational Psychology at the University of Wisconsin-Madison, with a specialization in school psychology. Her research interests include the implementation and evaluation of evidence-based intervention and prevention programs in practice settings, such as schools.