The Role of Interest in Fostering Sixth Grade Students' Identities As Competent Learners

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ABSTRACT

The combined works of John Dewey and Jerome Bruner provide a framework spanning a century of educational thought which can inform curriculum decisions concerning students' educational development, especially for middle school students whose waning of motivation toward school has been well documented by researchers and has long concerned parents and teachers. This framework, combined with recent contributions of motivation and interest researchers, can create broad understandings of how to collaboratively construct effective educational contexts. As early as 1913, Dewey specifically looked at the pivotal role of students' genuine interests in *Interest and Effort in Education*. Our current research focus on how students' interest can inform curricular contexts marks the recent shift showing an increased use of interest in education research since 1990. In this article, we discuss our study of a team-taught double classroom of sixth grade students whose interests were determined through a series of brainstorming sessions, and individual and focus group interviews. Students' interests fell into six categories centering around subject areas such as Drama, Science, and Animal Studies. Learning contexts were constructed around four of these subject areas. Students participated in

their first or second choice of subject area group. We found significantly higher scores on measures of Affect and Activation if students participated in their first choice group. We found intra-group unities of preferred and dispreferred ways of learning which distinguished each group from the class as a whole. Finally, our findings indicated that students reliably described their genuine interests over time. Students' interests were found to be effective tools for informing curriculum decisions in the creation of sixth grade learning contexts.

PROLOGUE

As the May sun streamed into a sixth grade classroom housed in a "portable," six students experimented with various kinds of materials that would protect their eggs from cracking when dropped from a table. One young man turned toward the sound of jubilant voices coming from the adjacent school field.

"Look at them," he said, drawing his partner's attention to the active twists and turns of his classmates who had chosen to learn about movement studies. "Aren't you glad you're in here and not out there!"
   After a quick glance at his classmates' maneuvers in the early spring green field, he turned his gaze to their workspace cluttered with cartons, clips, scarves, and eggs,
   "Yeah! Yeah! I sure am, I sure am!"
   (Conversation of two students while engaged in a science activity in their self-selected subject area interest group, May 1995.)

   The waning of motivation to engage in school-related behaviors in the middle school years has been documented by educational researchers (Eccles, Wigfield, Midgley, Reaman, MacIver, & Feldlaufer, 1993; Maehr & Anderman, 1993; Sansone & Morgan, 1992) and lamented by teachers and parents. How is it that students in the beginning years of formal schooling can bound off to school full of enthusiasm for the day's activities, whereas in the middle school years begin to experience the labor of school as a duty increasingly detached from their interests, values, and goals?
   To illuminate the reasons for this crisis of motivation, and to begin to chart a course of educational change that might redress this dilemma, we summarize the past and present hypotheses that have been offered to explain this oft-cited problem (Anderman & Maehr, 1994; Dewey, 1913; Eccles et al. 1993; Eccles & Midgley, 1989; Gottfried, 1985, 1990; Maehr & Anderman, 1993; Oldfather, 1995; Pintrich, Marx, & Boyle, 1993; Schiefele, 1991; Thomas, 1993). In so doing, we traverse the domains of educational philosophy, developmental psychology, and individual psychology. We then present our empirical work as an example of research that can address the issues raised by scholars as contributing to the motivational problem in middle school. Through creating an "honored voice" (Oldfather, 1995, p. 422) for middle school students in a research context, we hope to clarify the classroom contexts that support their engagement in learning.

REVIEW OF THE LITERATURE

Theoretical Perspectives on the Decline in Academic Motivation in Middle School

Dewey (1913, 1938), nearly a century ago, argued that the root cause of the motivational problem in school was the instantiation of the mind-body dualism in formal schooling theory and practice. He argued that this Descartian premise embedded in curricula meant that proper learning in school, particularly beyond the elementary years, was conceptualized as occurring through intellectual but not physical channels. Thus, motoric responses were to be "repressed" in favor of a cool registering and subsequent transformation of sensory material into formal knowledge. This by-pass of the actions of the body was characterized by Dewey as one of the factors contributing to negative achievement motivation.

Under such a regime it is not surprising that children are found to be naturally averse to learning, or that intellectual activity is found to be so foreign to their nature that they have to be coerced or cunningly coaxed to engage in it. So educators blamed the children or the perverseness of human nature, instead of attacking the conditions which, by divorcing learning from use of the natural organs of action, made learning both difficult and onerous. (1913, p. 70)

With an increase in body awareness in puberty comes developmental mastery needs and desires that impel young adolescents to organize their intellectual, social and emotional lives with direct attention to their bodies. Consequently, Dewey's description of the privilege of the intellect over the activities of the body in school learning is one lens through which we could view the decline in achievement motivation in the middle school years. A curriculum favoring formal, intellectual learning would be particularly averse to those students whose interests and competencies were in experiential learning that included physical actions.

Many contemporary educational researchers have characterized the motivational crisis as arising from a developmental stage educational environment misfit (Eccles & Midgley, 1989) in which the developmental demands of young adolescence conflict with the conventional curricula of middle school (Anderman & Maehr, 1994; Eccles et al., 1993; Maehr & Anderman, 1993; Oldfather, 1995; Pintrich, Marx, & Boyle, 1993; Thomas, 1993). As young adolescents experience their increased powers of cognition and self-reflection, they desire contexts that are supportive of their efforts in autonomy, social networking, and identity formation. Instead, in traditional middle schools, they encounter a curriculum that decreases individual decision-making (Eccles et al., 1993), emphasizes low-level processing of intellectual material (Thomas, 1993), and disrupts social networks through ranking students by ability (Anderman & Maehr, 1993). This situation diminishes positive affect in school-related activities (Sansone & Morgan, 1992) and contributes to an increasing psychological distance from school activities that do not support the competency and identity needs of this

developmental period. Maehr and Anderman (1993) consider this mis-
match as particularly problematic in the developmental trajectories of stu-
dents at risk for failure, in that school climate and related practices are
critical in the development of achievement motivation and social relations.

Another possible factor offered to explain the decrement in academic mo-
tivation in the middle years is the relative inattention that has been paid to
the individual subject-matter interests of young adolescents (Alexander, Ku-
likowich, & Jetton, 1994; Gottfried, 1985, 1990; Pintrich et al., 1993). Lack
of serious study in this area could be mostly attributed to the conceptual be-
lief that achievement motivations were stable personality traits and, there-
fore, not related to particular contexts of learning (Pintrich et al., 1993). The
work of Gottfried (1985), however, documents that students' intrinsic mo-
tivation is differentiated into school subjects, such as reading, mathematics,
social studies, and science, and that these interests exist in the face or ab-
sence of a general orientation to school learning. Gottfried (1985) found
that within specific subject areas of interest, students were intrinsically mo-
tivated, perceived themselves as competent and experienced low anxiety. Sec-
ond, intrinsic motivation in one subject area did not predict similar
orientations to learning in another subject area. This line of work would sug-
gest the importance of coming to understand what subject areas young ad-
olescents desire to know about so as to design classroom activities that will
engage them in purposeful activity (Alexander et al., 1994).

What these explanations appear to illuminate is the critical error we have
made, and sometimes continue to make, in conceptualizing middle school
learning as a cognitive activity absent from the predispositions of students'
bodies, the demands of their developmental phases, and their intellectual
"tastes" in learning about specific subject matter. It is our view that this sit-
uation can be redressed through a reconceptualization of the subject of re-
search for the purpose of clarifying the values, interests, and goals of middle
school students. Such a reconceptualization could lead to meaningful class-
room practices for young adolescents. How might this happen? We would
argue that a return to the study of "middle school students'" minds in pur-
poseful action would permit us to see how young adolescents construct mean-
ings in light of the full range of physical engagement in learning activities
that are necessarily guided by their unique developmental inclinations and
their individual predilections toward involvement with particular subject mat-
ter. We would suggest that one promising line of research that could un-
cover these relationships in learning for young adolescents is the study of
interest (Dewey, 1913; Hidi, 1990; Renninger, Hidi, & Krapp, 1992; Malone
& Lepper, 1987; Rathunde, 1993; Rathunde & Csikszentmihalyi, 1993; Ren-
ninger & Wozniak, 1985; Schiefele, 1991; Tobias, 1995).

Interest and its Contribution to Illuminating Young Adolescents' Experiences in Learning

Dewey's (1913) seminal work on interest and effort provides a rich theo-
retical framework for understanding the achievement motivation patterns

of young adolescents. For Dewey, the identification of students' specific interests in learning creates the context for understanding the meanings they attribute to particular learning experiences. He departed from the Descartian dualism of his time by suggesting that interest was both mental and material, a holistic experience that occurred when individuals were compelled to engage in action patterns critical to their growth as persons.

The genuine principle of interest is the principle of the recognized identity of the fact to be learned or the action-proposed with the growing self, that it lies in the direction of and is, therefore, imperiously demanded if the agent is to be himself. (p. 7)

Within his conceptualization of interest, Dewey identified three psychological components: (1) interest has an active quality to it, an individual "takes" interest; (2) interest is objective in that it is incorporated in an object of regard; and (3) interest is personal in that an individual is emotionally invested in the outcome of its interest. The particular interest choices made by students, Dewey argued, are the consequences of their valued social experiences. Dewey suggested that evidence for this origin of interest was provided in children's dramatic play activities. The imaginary contexts that children created and the ways they acted in those contexts reflected their ideas of how people they experienced and valued had used things in particular contexts. Thus, for Dewey, there was a melding of the student and the material conditions of his or her activities within contexts of interest.

Interest marks the annihilation of the distance between the person and the materials and the results of his action; it is the sign of their organic union. (p. 17)

Consequently, the problem of instruction for Dewey became one of finding content and materials that would engage a student in purposeful activity, in other words locating the student's genuine interests.

Working with the general framework created by Dewey, contemporary interest researchers have also characterized interest in holistic ways. Schiefele (1991) defines individual interest "as the relatively long-term orientation of an individual toward a type of object, an activity, or an area of knowledge that has two components: feeling-related and value-related valences" (p. 302). Hidi (1990) also views individual interest as developing "slowly over time and tends to have long-lasting effects on a person's knowledge and values" (p. 551). For all of the researchers studying individual interest there appears to be this relatively stable and long-lasting personal quality to interest that is content-specific and that contains emotional, value, and knowledge components (Rathunde, 1993; Renninger, 1987). These qualities of interest are the critical components in what is perhaps the most important attribute of interest for the middle school motivational crisis—the way interest moves a student to engage in purposeful activity. Dewey (1913) viewed the identification of the 'individual-subject-matter-

materials or actions' nexus as critical to learning in that genuine effort, metacognition, and means-ends understandings are the educative outcomes.

And our conclusion has been that the effort needed is secured when the activity in question is of such positive and abiding interest as to arouse the person to clearer recognition of purpose and to a more thoughtful consideration of means of accomplishment. (p.59)

Contemporary interest researchers have also documented the academic benefits of the identification of interest resulting in gains in persistence (Hidi, 1990), deeper processing of content (Tobias, 1994) and enhanced metacognition (Schiefele, 1990).

Recent work by Bruner (1996) creates a theoretical bridge from the work of Dewey to contemporary research on the mind. Bruner specifically referred to four contemporary lines of research work: metacognition, intersubjectivity, theories of mind, and collaborative learning. He states that what they all have in common is that,

Unlike older psychological theories, bent on imposing "scientific" models on children's cognitive activities, this work explores the child's own framework to understand better how he comes to the views that finally prove most useful to him. (p. 58)

Both Dewey and Bruner have looked to children to understand how they put together their world. Dewey looked at the ways children used materials in specific situations and contexts, while Bruner focused on the child's uses of language while learning. For Bruner (1985), children's ways of using language implied two different modes of thought: the paradigmatic and the narrative. Those children who tended to directly operate on the physical world to discover the general and timeless principles and concepts made use of a paradigmatic or logico-scientific language frame. On the other hand, children who were inclined toward understanding people, their motives, and their actions within specific contexts tended to use language in its narrative framing. Bruner believed that these ways of thinking emerged "spontaneously" for children and that they could be readily recognized without unusual analytical tools. The seminal works of Dewey from the beginning of this century, and of Bruner from the end of this century combine to create a useful framework and lens for developing and understanding the activities in our study. Both Dewey's and Bruner's emphases on exploring the nexus of the person-subject-materials/modes of operation in the terms of the child match our own research emphasis used in our interest inquiry.

This work provided a context for understanding interest as a holistic phenomenon, one in which aspects of consciousness and the objective, material situation in which consciousness is directed can be interrelated. It also permitted us to see Vygotsky's (1987) notion of consciousness as a unified whole that includes intellect, motivation, and affect, and to begin to address the change in the interfunctional relationships between these

components. Further, we came to agree with Vygotsky's claim that inasmuch as interfunctionality is present at all times, development cannot be reduced to a quantitative study of personality or the intellect in isolation. Interest, therefore, appears to be the kind of research inquiry that can disclose the interfunctional relationships in meaningful learning, and clarify the type of curriculum that will support middle school students' engagement in achievement motivation and their emerging identities as competent learners.

FOCUS OF OUR RESEARCH INQUIRY

Drawing on the theoretical frames of interest, language, and learning cited above, we designed our inquiry around the following questions:

(1) How do sixth grade students talk about their interests in learning? Is there evidence of Dewey's "person-subject-materials/modes of operations" identification or unity in interest, and/or a paradigmatic or narrative way of viewing the world?

(2) What is the nature of sixth grade students' engagement in subject-based activities of their primary or secondary interest?

(3) What are the uses of this kind of inquiry for increasing middle school students' purposeful engagement in learning activities?

DESIGN OF THE STUDY

Description of the Classroom Context

The students in this study were 47 sixth graders from a team-taught class in an exurban school in the American Midwest. The students were primarily of middle socioeconomic status. Approximately half of the students were children of farmers and the other half had parents who commuted to work in a nearby mid-size city. There were 24 females and 23 males in the sample. One male student was African-American, one female student and one male student were Asian American, and the rest of the students were Caucasian. Both of the teachers were veteran teachers with over 10 years of experience who, because of their shared interest in incorporating Gardner's (1993) ideas about multiple intelligences into their curriculum, were eager to participate in this research project. At the commencement of this project, however, the teachers had not yet included interest-based subject activities in their curriculum.

Procedures

We, as the research team, worked with the students for 1 year (see Appendix A for the overview of the activities). In September, we conducted class-

room observations to come to understand the nature of the curriculum. These observations were followed by small group brainstorming activities in October and November. In October, we were interested in understanding the kinds of activities that the sixth grade students liked to engage in outside of school. To that end, we created an imaginary scenario in which we asked the students to design an "ideal" weekend for a visiting international sixth grade student that would capture the ways they, as sixth grade students in the United States, liked to spend their free time. We assumed that their activity choices would reflect their predispositions toward engagement, and that within these varying activities were clues to the kinds of contexts that would foster or impede their learning. In small groups, led by the two teachers and the four members of the university research team, the students were asked to brainstorm their activity choices for this "ideal" weekend. Using the data, the research team employed semantic and conceptual mapping techniques to collapse the students' list of activities into smaller units. For example, the student brainstorming activities that specifically mentioned "doing things with friends" were collapsed into one item, "working with friends," and the choices that included "any kind of computer use" were encoded in the item, "working on the computer" (see Appendix B for this list). At the end of October, each student was presented with the list of twenty ways of learning that were derived from their activity choices during brainstorming. From this list, they were asked to *mark the three ways that helped them learn best* and the *three ways that helped them learn least well.*

In November, we invited each student to spend some time thinking about the kinds of subjects that they were interested in learning about as we were going to use their ideas to design small inquiry groups around these topics later in the school year. We conducted another small group brainstorming session, this time for the purpose of providing the students with the opportunity to describe the topics they were interested in studying. Led by members of the teacher-researcher team, we asked each student to select three different subject areas.

In December we interviewed each student individually in order to clarify and elaborate the students' choices on the ways of learning list and their topic selections during the small group brainstorming sessions. First, we asked each student to help us understand how their six selected ways of learning were helpful or not to them as learners. Subsequently, we made inquiries about their three topic areas of interest. First, we asked them if they remembered the choices they had made in their brainstorming sessions. If not, we told them. Then we asked them about their length of interest in the topics, the source of their interest, other people in their lives interested in the same topic, and related areas of interest to the topics they selected.

In February, using the list of topics selected by the students and elaborated upon in their interviews, we once again used semantic and conceptual mapping techniques to collapse the students' topic interests into six possible inquiry areas. The topics of study that emerged were animals,

fitness, social studies, drama, science, and computers. To form the groups, we presented the students with a list of these six possible inquiry areas followed by descriptions of each one (see Appendix C for the list). The students were asked to rate these six areas on a scale of 1 to 6, with 1 being the most preferred content area interest and 6 being the least preferred. As there were four university researchers available to lead the groups, the four most popular content choices were used to form the student inquiry groups. The four inquiry activity settings selected by the students in this ranking system were science, drama, animals, and fitness/movement. All students received either their first or second choice of an inquiry activity setting. In April and May, we conducted four hour-long sessions and one culminating group activity with the students in their interest-based inquiry activity settings.

Data Sources and Analyses

Our data sources are both categorical/denotative and interpretative/connotative, because we were interested in understanding both what sixth grade students were interested in studying, as well as *how they talked* before and after engaging in their chosen inquiry settings, and how they *talked and responded* during engagement in these same settings.

Categorical/Denotative Data

We had three sources of categorical/denotative data. The first set included the students' six responses to the ways of learning list. The students' three topic interests comprised the second set. Third, during the first of the four inquiry activity settings we collected two sets of in-situ data about their affective and activation states (one during the middle of the session and one at the end), using a three-page questionnaire containing subjective and objective questions adapted from past Experience Sampling Methodology (ESM) studies (Csikszentmihalyi & Larson, 1984; McPhail, 1993). We obtained complete ESM data from 40 students in the class. The students' responses were measured on two scales: Affect and Activation. In an earlier study by Csikszentmihalyi and Larson (1984), the internal reliability of these scales was found to be high (.85 for Affect, .78 for Activation). We used t-tests to compare students with their first choice to the other students, with a significance level for the two-tailed tests of .05. Additionally, since engagement over time in a knowledge area has been positively related to individual interest (Dewey, 1913; Hidi, 1990; Schiefele, 1991), we analyzed both the topic choices named by the students in their interviews as well as the length of time these students reported being interested in their first or second choice of inquiry group.

   We compared this categorical/denotative data of students within and across inquiry activity settings to highlight intra- and inter-group unities and disunities. For these analyses, we explored trends based on each student's first choice of topic of study rather than on their eventual group placement. We were interested in exploring the ways the students who selected either drama, science, animals, or fitness/movement as their first

choice inquiry group were similar or different in terms of their preferred and dispreferred ways of learning and preferred topics of study.

Interpretative/Connotative Data

We had three sources of interpretative/connotative data. The first set consisted of the individual interview data collected in December. The second set included focus group interviews with the students in the science and drama activity groups at the end of the second session in May. Focus group data was not available for the animals and movement groups. The third set consisted of semi-structured interviews with two students from each group who had been targeted by the teachers as being particularly disengaged during the regular curricular activities.

These data sources were used to help us understand how the sixth grade students who participated in inquiry groups of their first choice describe their relationships to their topic interests at three different time periods across the school year. First, since the individual interviews took place approximately 5 months before the students participated in their activity groups, we used these interviews to analyze the ways the students *initially* talked about their preferred choices of topics to study. Next, we analyzed the ways the students in the science and drama inquiry groups talked in focus groups interviews about their experiences in their inquiry groups after two sessions. Last, we analyzed the response of the two students from each group who had been targeted by the teachers as being particularly disengaged from their everyday schoolwork. In conducting these interpretative analyses of the students' responses, we were looking for language patterns within and between groups and across time in order to ascertain evidence of a Deweyan unity of person-subject-materials/ways of operating and/or evidence of Bruner's distinct epistemological and ontological ways of thinking.

RESULTS

First, affect and activation data for the class as a whole is reported. Following this analysis, the results of the analyses of each group's data are divided into two subsections for each of the four inquiry groups: science, drama, animals, and fitness/movement. The first subsection examines the categorical/denotative data, while the second subsection explores the interpretative/connotative data.

Affect and Activation

There was a significant difference between the mean scores of the students who received their first choice and of the students who did not get their first choice in content areas of interest. This difference was seen in the mean scores on the Total Affect Scale ($t = 2.80$, $p < .05$) and on the Total

Activation Scale ($t = 2.99$, $p < .05$). Students participating in inquiry settings of their first choice rated themselves higher on affect and activation than students who participated in inquiry settings not of their first choice.

Comparative analyses indicated noteworthy differences of both the number of topic choices named in the interviews related to their first choice of activity setting and length of time the students in their first choice of inquiry setting reported being engaged in related topics to that of their inquiry setting versus those who did not receive their first choice. First, of the 16 students who received their first choice inquiry setting (data was not available for four students), all of the students except three named topic choices related to their selected inquiry settings. Of their three topic choices, one student named three related topics, five students mentioned two, and seven named one. In contrast, of the 15 students who were not in their first choice inquiry settings (data was not available for five students), seven students named only one topic choice related to their non-first choice activity setting, and three students did not mention any related topic. In addition, there were significant differences in the length of time the students reported being interested in their first or non-first choice activity setting. The students in their first-choice inquiry setting reported being interested in related topics for longer periods of time. Responses were coded in four categories: (1) less than a month or extremely vague, (2) 1 month to 1 year or somewhat vague, (3) 1 to 3 years, and (4) over 3 years or a very long time. Of the 16 related topics mentioned by the students who were in their first choice activity setting, six of the topics were ones that the students had been interested in for over 3 years, six other ones for 1 to 3 years, two topics for 1 month to 1 year or somewhat vague, and two other topics for less than 1 month or extremely vague. In contrast, of the seven choices named by the students who were not participating in their first choice activity setting, the students reported being interested in three of them for 1 to 3 years, one for 1 month to 1 year or somewhat vague and three for less than a month or extremely vague.

Science Group

Of the students who selected science as their primary interest (first choice: $n = 5$), a distinct intra-group unity in content interest was clearly indicated with all five students specifically mentioning scientific content interests such as Aviation, Chemistry, Electricity, and Robotics. (Two students chose two science content interests, and one student chose three.) Intra-group unity of preferred ways of learning was also noted with all five students in the group preferring to learn by building models, doing an experiment, and working on the computer. Students in this group were more than 2.5 times as likely than the class as a whole to choose these ways of learning. This was a key distinction given the fact that these ways of learning were in the top four chosen by the class as a whole (See Appendix D for a ranked list of students' choices). Interestingly, unity was also seen in the science

group's dispreferred ways of learning. All five students in this group spoke about dispreferring to learn in ways they perceived as distracting, leading to loss of interest and focus.

The above findings were directly supported by the science group students' talk as revealed in the following samples from the three interviews. Furthermore, these students viewed the science activities as advancing their understandings through creating contexts which allowed for clear, focused thinking. The consistent nature of the students' talk over these three points in time becomes evident in their narratives.

Individual interviews: December.

Student 1:   Building in 3D and hands-on stuff is fun, boring just reading papers. I like computers, like accessing information on Compton's Encyclopedia.
Student 2:   Building models helps me think how it really is and what it was really like. I can see it in three dimensional and so helps you get an image in your head.
Student 3:   Doing an experiment gets information firsthand ... (in building models) making what it actually looks like; see while you are doing it.
Student 4:   (Building models) taught me and (in drawing blueprints) have to research what you are drawing.
Student 5:   (Building models) helps me if structure is right in front of me and (in doing an experiment) lets you experience if something's going to work or not.

Focus group interview: May, Week 2.

Teacher: Did you like trying to build the tallest tower out of paper and straws?
Student 1:   I didn't like the straw one because it was easy.
Student 2:   I liked it because it, it was challenging enough to make you think about how you can, how you can accomplish your goals.
Student 3:   It was fun. Challenging.
Teacher: Did you like anything that is challenging?
Student 1:   Yeah ... Oh, not everything. As long as it's worth doing.
Teacher: What kinds of science do you like to do?
Student 1:   Build something electrical.
Student 2:   Build something out of metal.
Student 3:   Build something that can fly.
Student 4:   Build something that runs on sound.
Teacher: You all like making things?
Students: Yes, yeah, yes, yeah.
Teacher: Why do you like making things?
Student 1:   There's so many possibilities.

Individual interviews with targeted student: May, Week 4.

Teacher: Why did you choose this group?
Student: I like science stuff, learn different things like electricity.
Teacher: What did you do in your group?
Student: Airplane flights, paper worm searching, categorized stuff, built towers, dropped eggs, floated straws.
Teacher: What did you enjoy the least?
Student: I didn't really least like anything.

Teacher: What did you learn about yourself from participating in this group?
Student: I couldn't always do the best. Good thing to learn.

Drama Group

An inverse relationship was found between the Science and Drama Groups. Students in the Science group preferred to work and learn in a few, precise ways. Students in the Drama group, on the other hand, preferred to work and learn in multiple, diverse ways. This inverse relationship was highlighted by the data from the scale where students ranked their choices for participating in content inquiry groups on a scale from 1 to 6, with 1 being their first choice, and 6 their last choice. All five members of the Science group marked Drama as a 5 or 6 on this scale. Conversely, five students in the Drama group marked Science as their last choice. The Science and Drama groups showed the clearest distinctions with respect to preferred and dispreferred ways of learning out of all the inquiry groups in this study.

Among the students who chose drama as their first choice (first choice: $n = 7$), intra-group patterns of unity were found in content inquiry interests and preferred ways of learning. Students in this group were interested in the study of people, different cultures and multiple representations of cultures (e.g., photography, art, theater, etc.). They were drawn to learning in diverse ways that were often underrepresented in conventional middle school settings such as using drama to learn, listening to music while learning, taking active breaks during the day, and going to different places. The most striking unity seen in the drama group which distinguished their group from the class as a whole was seen in their dispreferred ways of learning. The students in the drama group concurred that they disliked taking notes (five students), brainstorming (four students), and, as a group, were over three times more likely to choose these ways of learning as dispreferred than the class as a whole.

As with the science group, the drama group students' talk evidenced consistency over time. Yet, as the following interview excerpts demonstrate, the nature of their talk was distinctly different in terms of what it was that the students found engaging about their learning activities. For the drama group, it was of particular importance for these students to be able to experience varying sociocultural roles.

Individual interviews: December.

Student 1:   In church, if we act it out, I remember those verses. I like to act. It doesn't matter about the audience.
Student 2:   I've always loved writing stories. You can make up your own world base the characters on yourself. Through poetry, you can really tell how the author is feeling.
Student 3:   I want to become an actress in the movies. I've been interested in acting ever since I was a little girl.
Student 4:   Interested in the brain, psychology, and photography. How you think and memory is interesting. Lots of people come to me for advice. Friends come with problems.

Focus group interview: May, Week 2.

Teacher: What did you like best about the group today?
Student 1:   I like acting and we all got a turn.
Student 2:   . . . and you really want to do it
Student 3:   When we were acting, you can just be yourself and like do what you thought.
Student 4:   Yeah, you weren't worried about impressing.
Student 5:   Yeah, we felt comfortable with each other.
Student 1:   I liked acting the stuff out last week because you get to show your feelings and all that stuff. You're able to communicate with other people just through using your body.
Student 2:   Yeah, you don't really feel like you have to learn anything, like even though you are learning.
Student 3:   You don't know that you're learning 'cause you're having fun.
Teacher: What have you learned?
Student 1:   . . . how to be more considerate—clearing your voice to read out to everybody.
Student 2:   Cooperating with other people.
Student 3:   Face expression that's really important . . . you have to show the people what you really mean, because you might be thinking it but it's not showing for everybody else.

Individual interview with targeted student: May, Week 4.

Teacher: What did you like best about the drama group?
Student: Because you get to be someone else and not yourself. I like, I think it's fun being someone else.
Teacher: Why?
Student: Well because you're yourself every day. And you know you talk about being in someone else's shoes and stuff and it's like your chance to do that . . . It makes me happy.
Teacher: Why?
Student: Because you get to do something different.
Teacher: Anything else?
Student: Um, well you get to get up and move around and in class you just sit in your chair all day.
Teacher: OK, what did you enjoy least of all the things you did in the group?
Student: Filling out those form things.
Teacher: Why?
Student: Because I hate writing . . . it takes so long.

Animal Group

Students who chose the study of animals as their first choice (first choice: $n = 19$) revealed patterns of inter-group unity between the animal and movement inquiry groups. In terms of content inquiry interests both groups were interested in athletic activity. Concerning preferred ways of learning, both selected the option of adding idiosyncratic choices to the preferred ways of learning list. Finally, concerning dispreferred ways of learning, both groups dispreferred watching movies and drawing. The students in the animal and movement groups embraced physicality, where they could test their growing skill in the physical world, an aspect of bodily-kinesthetic

intelligence (Gardner, 1983). However, a marked distinction existed be-tween the two groups in terms of specific content interests. Intra-group unity was seen with 10 students in the animal group specifically mentioning animals as a strong interest; whereas, only one student in the movement group chose animals as a content interest. Furthermore, it is important to note that the only students who ranked the Animal Inquiry group as a 5 or 6 (last choice) had ranked the Movement group as a 1 (first choice).

Overall, the Animal Inquiry group had by far the largest number of students ranking the group as first choice (19) and the lowest number of students ranking it as last choice (2), while all other groups had received a ranking of last choice from at least eight to twelve students. The data suggests that curriculum which included Animal studies would, at the least, not be met with strong disinterest by this group of sixth graders. The interview data indicated that the students who ranked Animals as their first choice were interested in studying animals through active engagement with them and/or through conventional scholarly study. As with the findings from the science and drama inquiry groups, the talk of the students in this group evidenced a consistency over time.

Individual interviews: December.

Student 1:   I have been interested in grooming horses almost all my life. I have been studying and researching horses a long time.
Student 2:   I became interested in wildlife in fifth grade. I went to an art fair and saw pictures of wildlife. I bought one of a wolf. I thought, what a magnificent animal. My mom's bought me wolf stuff.
Student 3:   I am interested in hunting deer. I want to learn how to do it right. I want to learn how to get better scores. Going to different places like the water treatment plant and the Children's Museum helps me learn because you can see how it works or how it does something. Taking active breaks helps me learn also because it's easier to remember stuff if you take a break.
Student 4:   I am interested in the animals in the sea—sharks, there's a part on their side in their gills that cleans their bodies. They don't know if they really do.

Individual interview with targeted student: May, Week 4.

Teacher: Why did you choose this group?
Student: I like animals and I have lots of animals.
Teacher: What did you enjoy best?
Student: The pet show. I liked seeing the animals, having them at school.
Teacher: How did the things you did in this group compare to what you regularly do in your classroom?
Student: The topic is different, animals are not covered in school. Also, the things we did were more active than most things we do (in class).

Movement Group

Within the movement content inquiry interest group (first choice: $n = 9$), in addition to the inter-unity patterns with the animal group, the patterns

of unity were similar to the drama group in that this group also preferred a wide variety of ways of learning, with one important distinction. The movement group specifically added numerous idiosyncratic choices to the original list of 20 preferred ways of learning. Six students in this one group added ten new, idiosyncratic ways of learning to the list (science added 0, drama added 2, and animals added 6). Intra-group unity was again seen most clearly in areas of content interest. Seven of the nine students in the movement group showed specific content interests in athletic activities and computers. Eight students in the group also displayed unity in dispreferred ways of learning in that the group was more than twice as likely as the rest of the class to indicate a dislike of visual, passive activities such as watching movies, demonstrations, and drawing.

The Movement group's distinction from the Animal group (the only students to rank Animals as their last choice came from the Movement group) is understood more clearly when seen in light of further data. Seven of nine students who ranked Movement as 1 ranked "Around the World" as their last choice. These data suggest that students in the Movement group are most interested in developing their sense of personal skill, competence, and identity in their own world, and are not necessarily as interested in the larger world—whether that larger world involved the world of "Animals," "Around the World" of cultures, or even the conventional world of school. These students' strongest interests seemed to lie in developing a strong sense of identity and personal competence with respect to the challenges offered by athletic activities and computers. This group of students specifically mentioned interests in numerous individual, athletically challenging endeavors such as parachuting, hang gliding, downhill skiing, snowboarding, scuba diving, snorkeling, and horseback riding. These students seemed to always be ready to challenge themselves on to further "personal best" horizons. Movement group students' idiosyncratic choices and their preference for engaging in athletic activities is directly evident in their talk across time. Students specifically talk about how movement enhances their learning.

Individual interviews: December.

Student 1:   I am interested in figure skating because I want to learn to do jumps. I like doing things outside [an idiosyncratic way of learning not included on the list] because the outdoors helps me think better. I learn best when I am active, having fun learning your subject and not just sitting at your desk.

Student 2:   I want to learn how to ride horses, rappel waterfalls, and ski. I am also interested in parachuting, hang gliding, bungee jumping. Reading by myself to myself and having more time [both idiosyncratic ways of learning not included on the list] help me learn. When others read to me, I don't get it as well. I wander away. If I read a paragraph I can check back, it usually makes sense. Having more time helps me learn because I'm a slow writer and I don't understand it as well when I'm tired. In school, I'm more hyper.

Student 3:   I am interested in downhill skiing, scuba diving, windsurfing, roller blading, snowboarding, and snorkeling. I want to do roller blading to practice for skiing. Taking active breaks can help me think. Listening to music helps me think in that my head goes as fast as the beat's going. I did really good on my math sheet while listening to music in my room, got the answers right away.

Student 4:   I like architecture, photography, and sports, particularly soccer, basketball, and horseback riding. I learn more about things when I teach someone younger [an idiosyncratic way of learning]. Also talking to experts helps in that I learn from them, like talking and sometimes books do not have the right answers. I like working on the computer too because good software has pictures, videos, and slides. Working on the computer is not like reading in that I can actually see most of it.

Individual interview with targeted student: May, Week 4.

Teacher: Why did you choose this group?
Student: Because I like fitness.
Teacher: Compared to what you regularly do in your classroom, how were the things you did in your group different?
Student: In classroom we usually sit around and listen to our teacher and do our homework. Here we were doing what we liked and going somewhere.
Teacher: Is there anything that you did in your group that you could do in your class?
Student: It would be a lot less boring if we have one time set aside that we could go outside and play. Help teach you about exercises and how it's good for you. I think it is more fun to do something than watch TV. Feel better if doing something. I don't like sitting and listening.

Summary

There is evidence of increased Affect and Activation for the students who engaged in their first choice of inquiry activity setting. Additionally, the students' expressed topics of interest appeared to be related across four subject areas to their preferred ways of learning even though these categories were not linked conceptually or temporally in the individual interviews and the small group brainstorming activities. For example, the students in the Science group indicated that they wanted to be engaged in learning through scientific modes of inquiry and be inquirers of scientific topics. The Drama group's interests in inquiry learning of different cultures and different creative representations tied directly to their preference for learning through modes associated with the social sciences and humanities. The strong interest in the physical world with a specific interest in animals expressed by the students in the Animal inquiry group suggested that these students wanted to be engaged in the study of animals in a combination of standard (working on computer) and non-standard (going to different places) learning methods. The movement group's inquiry interests in individual, athletic pursuits tied to their interest in non-standard ways of learning—indicated in their idiosyncratic preferred ways of learning choices.

These data suggest that these sixth grade students' inquiry interests of science, drama, animals and movement are linked to the materials and ways of being engaged associated with those domains. In articulating both the what and the how relative to their inquiry interests, these students have provided us with a window into the kinds of learning contexts that are likely to be synergistic and engaging.

DISCUSSION

Our study of interest in a team-taught sixth grade classroom indicated three significant findings. First, sixth grade students who were working in inquiry settings that reflected their primary content area of interest experienced higher levels of affect and activation than their peers who were not engaged in content-based activity settings of their first choice. Second, among the students who chose the study of science, drama, animals, and movement as their first choice, there was evidence of the unity of "person-subject-materials/ways of operating" which Dewey (1913) defined as being the hallmark of genuine interest and identity development. Last, it would appear from this study that sixth grade students can reliably describe their interests in learning, and that the use of these interests in the design of curriculum can increase student engagement in learning.

The Role of Affect and Activation in Contexts of Interest

The increased levels of affect and activation experienced by students while participating in their first choice activity settings could be interpreted as a predictable finding given the weight of literature that has underscored the importance of giving students control over their learning (Corno, 1992; Deci & Ryan, 1985; Malone & Lepper, 1987) and that has drawn significant relationships between intrinsic motivation, interest, positive affect, and increased levels of activation (Csikszentmihalyi, 1975, 1990; Deci & Ryan, 1985; Lepper & Cordova, 1992; Prenzel, 1992; Rathunde, 1993; Sansone & Morgan, 1992; Schiefele, 1991). In the context of middle school education, these findings confirm the importance of "honoring the voices" (Oldfather, 1995) of young adolescents in terms of understanding and using their "tastes" in subject matter for the purpose of creating learning activities within the classroom that will be intrinsically motivating (Alexander et al., 1994; Gottfried, 1985, 1990).

   While we agree with Schiefele (1991) that a positive emotional experience should be viewed as an authentic academic outcome in its own right, we are also impressed with the research that has documented the importance of students' affective orientation during instruction. In several studies, using various means of affect induction, it has been found that positive affect can serve as a retrieval cue for material in memory, influence categorization and similarity judgment, and aid in creative problem solving (Isen, Daubman, & Goroglione, 1987). Schacter (1996) adds to this work

by suggesting that contexts of learning that are personally meaningful can contribute to remembering information. While we were unable to address this issue in our work, we would imagine that the positive levels of affect and activation recorded by the students while engaged in their content activity settings of first choice would increase the salience of the information gained within this setting, and, therefore, heighten episodic memory. However, this hypothesis awaits confirmation or disconfirmation in future research.

Understanding Students' Thinking in Inquiry Activity Settings of Interest

While the in situ affect and activation analyses could be regarded as confirmation of the relationship of positive emotion and higher energy levels in contexts of interest, two other lenses seemed most helpful in analyzing our results regarding within- and between-group similarities and differences. The "person-subject-materials/modes of skill nexus," postulated by Dewey (1913) as an indication of "true interests" was one means of viewing the activity groups.

True interests are signs that some material, object, mode of skill (or whatever) is appreciated on the basis of what it actually does in carrying to fulfillment some mode of action with which a person has identified himself. (p. 43)

The second lens was Bruner's (1985) distinction between paradigmatic and narrative modes of thought.

Bruner's (1985) paradigmatic or logico-scientific mode of thought seems to capture the ways the science students see the world. Their talk revealed that they are oriented to acquiring scientific knowledge about the world in ways that will yield empirical clarity. There is a sense of these students wanting to understand the physical world through direct action on it. Insofar as these students seem to have already identified with traditional scientific ways of seeing the world and operating within it, activity settings that reflect these values would increase these students' levels of engagement. These students would be able to identify themselves with activities that reflect their ways of seeing the world and support their ways of operating within it. The activities in the science group were designed to reflect these meanings, and, therefore, undoubtedly created a learning context in which the students would be intellectually and emotionally invested. The dialogue that serves as prologue to this paper eloquently illustrates this proposition. Sjoberg (1983) offers evidence for the relationship of student interest to the particular ways domains of inquiry are structured. Swedish high school students enrolled either in the science or technology areas of specialization identified the logical structure of science and mathematics as particularly supporting their interest.

In sharp contrast to the science students, the students who chose drama had a very different "subject-material/modes of skill nexus." These students were interested in subject matter in the general area of Humanities

and wanted to be engaged in creative representations of people and their worlds. The narrative mode of knowledge described by Bruner (1985) tends to describe their ways of organizing experiences and making sense of the world. Unlike their peers who chose science and wanted to use the logico-scientific skills to advance their knowledge interests, these students want to understand the human world and the range of responses within that world. They desired to place themselves in this narrative world through active participation in the possibilities of "other worlds." Creative representations such as poetry, writing, and acting invited them to experience new ways of life, and produce new kinds of texts. They do not want to be limited by the logico-scientific mode of thought that dictates precise reference to the empirical world, but instead want to be liberated to creative uses of language that are saturated with human meanings. The work of Sjoberg (1983) also offers some support for this human science orientation on the part of the students engaged in drama inquiry. He found that the high school students who had negative attitudes toward technology were more interested in the social sciences, history, languages, or biology.

Bruner (1985) would suggest that the narrative and paradigmatic worldviews are incommensurable, and the contrasts in the profiles of the drama and science students seem to confirm this view. The drama students are oriented to understanding the human world through direct engagement in the subject (human beings and the multiple ways they make meanings) and the skills involved in understanding that subject (being somebody else, entering other worlds through various kinds of representational systems). Like well-informed human scientists, they seem to appreciate that understanding in this realm comes through direct experiences in all of the possibilities of being human. Interestingly, while the science students desired to experience the "other worlds" of the physical domain, the drama students wanted to participate fully in the possible worlds of the human realm. The opportunities provided to the drama students through engagement in theatrical activities undoubtedly contributed to their experiencing positive emotion in their group.

However, assuming that narrative and paradigmatic worldviews are incommensurable creates problems in analyzing the animal inquiry group. Students who selected the study of animals seem to be operating within both modes of thought. On a narrative level, they express a desire for the companionship that animals can offer and relate their experiences of interacting with animals. On a paradigmatic level, the students who selected animals evidence a desire to study more about animals. Their "subject-material/modes of skill nexus" for the animal group indicates their desire for active pursuits. These students would be inclined to be intellectually and emotionally invested in the activities within the group given that the structuring of activities in the animal group included the study of animals through active engagement with them both in and outside the classroom.

The students who chose the study of movement as their primary area of interest shared the "subject-material/modes of skill nexus." However, unlike the profiles of the members in the science and drama group who chose those areas as their primary interests, the members of the movement group

cannot be easily categorized into academic language of either narrative or paradigmatic modes of thought. We would suggest two reasons for this situation. First, the bodily-kinesthetic intelligence (Gardner, 1983) has not been instantiated into the rhetoric of academic school curriculum. Dewey's (1913) lamentation of the incorporation of the mind-body dualism, at the expense of valuation of educative physical experiences, speaks to this omission. Second, athletic activities have been marginalized from academic activities through relegation into the sports domain of after-school activity. As the data did not permit us to further explore the meanings of bodily movement to these students, we cannot know whether movement is merely a way of responding to the mental stresses imposed by the school world, or whether the study of movement, in its own right, could be used to develop these students' competencies and knowledge in a different way than only through sports. As it is clear that these students want to be engaged in bodily movement, activity settings that reflect this interest should increase their levels of engagement.

Reliability of Students' Talk Relative to Their Interests

Educational researchers working within a developmental frame of reference have criticized middle schools for their failure to provide contexts of learning that support young adolescents' intellectual, social and emotional development. That line of research has illuminated institutional and pedagogical practices that are developmentally inappropriate for young adolescents. This study offers further confirmation of the misfit of adolescents' desires in learning and conventional instructional school practices. Our research also suggests that understanding young adolescents' individual ways of thinking and operating in the world in relationship to motivation to learn has been underexplored in that line of inquiry.

This present research inquiry suggests that individual middle school students' "talk" about their interests in learning is reliable over time and can be used to illuminate the mismatch in the predispositions that young adolescents bring to learning and the middle school curriculum. In this work, we designated the students' talk as reliable for two reasons. First, in focus group work and individual interviews, the original 47 students identified subject area interests collapsed into six general categories. When given choice regarding these six subject interest areas, the students who were able to work in content-based activity settings of their first choice reported experiencing higher levels of affect and activation than their peers who were not able to work in their subject areas of first choice. This suggests that students could identify what they were interested in learning about, and that their subject area interests were linked to their commitments in learning in that area. Second, in retrospective analyses of the students' talk in individual and group interviews regarding their predispositions toward and aversions to particular ways of learning, we came to appreciate the coherence of their narratives. Students who had been engaged in actions that were congruent with their talk regarding their ways of seeing themselves in learning expressed a unity of "saying and doing"

(Bruner, 1990, p. 19). This unity was reflected across various situations of discourse and action within the classroom over a period of one school year. What emerged from this analysis is not the "ontology of the impersonal event" (Ricoeur, 1992, p. 74) lamented by Ricoeur as an outcome of our epistemological focus on the "what" and "why" of action, but rather an understanding that action patterns that engage middle school students are saturated with individual constructions of the world and themselves in the world.

We suggest that coming to understand middle school students' learning interests and using them in the design of curriculum can foster their identities as competent learners by building on young adolescents' budding "individual" ontological and epistemological constructions of meaning. In the context of young adolescents' developmental orientations toward individual competency, a line of research that would uncover "who" middle school students want to be and "why" would enable us to understand how to support individual intellectual growth in the classroom in the context of a setting that is developmentally appropriate. Since young adolescents are busy at work in their self-definitions, research and practice that would inform them of their proclivities in learning through heightening their self-awareness and self-understanding of what is important to them would advance their engagement in school learning while supporting their development as persons. This study would suggest that middle school students' talk about their subject areas of interest is reliable across time and situation, and, as a consequence, can be used in formulating domains of study that will engage students.

CONCLUSIONS

Dewey (1938) suggested a two-step process to the design of curriculum. The first involves the identification of the material for learning within the students' ordinary life experiences. The second, far more problematic, is the development of an organized subject-matter that builds on the students' knowledge gained from their experiences. He recognized that the second process presents particular challenges in the middle school years and beyond,

Those who deal with the pre-school child, with the kindergarten child, and with the boy and girl of the early primary years do not have much difficulty in determining the range of past experience or in finding activities that connect in vital ways with it. With older children both factors of the problem offer increased difficulties to the educator. It is harder to find out the background of the experience of individuals and harder to find out just how the subject-matters already contained in that experience shall be directed so as to lead out to larger and better organized fields (p.75).

Our work suggests that this problem can be addressed through a phenomenological approach directed to illuminating students' worldviews and

knowledge structures around their "genuine interests," and that these can be effectively used in the design of curriculum that will increase purposeful learning. Within our study, using various kinds of evidence derived from small group focus work, inquiry settings centered on students' content interests, and individual interviews, the sixth grade students expressed a consistency in what and how they wanted to learn. Additionally, within their expressed content areas of interest, there was a unity of "person-subject-materials/ways of learning" that confirmed the notion of interest as a holistic phenomenon. Consequently, students with distinct interests in the subject areas of science, drama, and animals could be easily distinguished from each other based on their expressed ontologies and epistemologies. Except for the students with an interest in movement studies, the other students' learning interests appeared to conform to the cultural modes of thinking identified by Bruner (1985) as paradigmatic and/or narrative. These cultural modes of thinking provide a rich, historical context for the design of curriculum that will tap into students' optimal ways of learning. These preferred ways of learning and thinking represent the substance of the students' experiences that have been and continue to be intellectually, socially, and emotionally significant. Finally, these results suggest that the achievement motivation problem in middle school could be redressed through re-visiting the traditional curriculum in terms of the ways it does not "match" sixth grade students' natural interests in learning. Educational philosophers and motivational researchers have identified many of the institutional, developmental, and psychological factors that contribute to the disengagement of young adolescents in achievement motivation. The task before us is to develop a way of coming to understand how these factors are interrelated in the activities and minds of middle school students. We would argue that the study of interest is one analytical frame that is likely to help uncover these interrelationships that are the rich meaning-making systems of middle school students relative to learning and thinking. While we do not see these meaning-making systems as necessarily stable across situation and time throughout the students' lives, we do see the process of identification and implementation in middle school classrooms as fostering students' intellectual and social-emotional development and leading to their identities as competent learners.

NOTE

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APPENDIX A

Time Line for Interest-Based Activities

September   Observations
October   Small group brainstorming sessions for the purpose of understanding the kinds of activities the sixth grade students liked to engage in outside of school.

   Students chose the three ways that helped them learn best and the three ways that were the least helpful from a list of 20 ways of learning compiled from the students' preferred activities as ascertained through the brainstorming sessions and from ideas generated from the research team. See Appendices B and D.

November   Small group brainstorming sessions for the purpose of understand-
            ing the ideas or topics the sixth grade students would like to know
            more about.
December   Individual interviews with students for the purpose of understand-
            ing the reasons for their preferred/dispreferred ways of learning
            and their subject matter interests.
February   Students selected the subject-based activity settings they wanted to
            be engaged in through a ranking system (see Appendix C).
April/May   Students were engaged in activity settings of their first or second
            choice.
April   Twice during the first meeting of the activity settings students re-
            corded their levels of affect and activation using Experience Sam-
            pling Methodology measures.
May   At the end of the second session, students in the Science and
            Drama groups participated in focus group interviews.
                 Each of the four subject-based activity groups presented their
            work to the class as a whole.
                 Two targeted students in each activity group were individually
            interviewed at the end of the interest based activity intervention.

APPENDIX B

List of Ways of Learning

Name:
   Put a 1 beside the 3 ways that help you learn best.
   Put an 0 beside the 3 ways that help you learn least well.

   _____ acting something out

   _____ brainstorming

   _____ building models

   _____ doing a project

   _____ doing an experiment

   _____ drawing

   _____ experiencing something new

   _____ getting excited about something

   _____ going to different places

   _____ listening to music while learning

   _____ playing a game

   _____ snacking while learning

   _____ taking active breaks during the day

   _____ taking notes

   _____ talking to experts

   _____ thinking

   _____ touching new materials

   _____ watching a demonstration

   _____ watching movies

_____ working on the computer

_____ working with friends

APPENDIX C

Inquiry Activity Setting Choices

Directions: Number the following activities from 1–6 according to how well you would like to do each in the classroom (with 1 being the most liked and 6 being the least liked).

____ Amazing World of Animals: Do you find animals fascinating? This activity offers the chance to discover interesting information about all kinds of animals.
____ Fitness Plus!: Does your energy level get so high that you just feel like you should get moving? You'll be moving all you want in this activity.
____ Journey Around the World: Have you ever wondered what it would be like to live in a different country or among different people? Here is your chance to explore the world without ever leaving the classroom.
____ Lights, Camera, Action!: Do your friends always tell you what a good actor or actress you would make? This may be your opportunity to find out if they are right.
____ Science Discovery: Do you find doing science hands-on an exciting experience? This activity allows you to conduct your own science experiments.
____ Voyage to the Center of the Computer: Are you the type of person who would spend hours before the computer if you could? This might be the ideal activity for you.

APPENDIX D

Students' Choices of Their Top Three Preferred and Dispreferred Ways of Learning ($N = 47$ students)

Preferred		Dispreferred
Top five ways that help students learn best		
14	working with friends	6
12	doing an experiment	0
12	building models	4
11	working on the computer	5
9	going to different places	1
Students showed a mix of preferences		
9	taking active breaks during the day	7
4	talking to experts	8
6	brainstorming	8
7	listening to music while learning	10
4	watching a demonstration	6
4	taking notes	8
3	acting something out	9
7	doing a project	2
0	touching new materials	3
0	experiencing something new	0
18	idiosyncratic choices	1

Five ways of learning that are least helpful

6	watching movies	16
6	drawing	16
3	snacking while learning	12
2	playing a game	10
2	getting excited about something	10