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Assessing the Developmental Instruction Model: An Exploratory Study of Classroom "Fit" Using Environmental Types

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To support the instructional process, Knefelkamp advanced the developmental instruction model (DIM) to describe the aspects of academic environments that facilitate the epistemological development of college students, consistent with the Perry scheme. No related measurement tool has been developed for the DIM, which may account for the lack of research on it. Because the four DIM constructs (experiential, diversity, personalization, and structure) seemed consistent with the four dimensions found in environmental type theory (extraversion–introversion, sensing–intuition, thinking–feeling, and judging–perception), its related measure, the Salter Environmental Type Assessment, was used. The assertion that advanced learners begin to recognize these four dimensions was examined in this study of students' ($N = 200$) perceptions of classroom "fit" by class standing. As compared to first-year students, advanced undergraduate students in this sample indicated stronger preferences (toward environmental extraversion, intuition, and feeling) for the types of learning environments that would support epistemological development. Findings related to environmental judging–perceiving were mixed, however. The results also suggest that the Salter Environmental Type Assessment may be a workable measure of the basic constructs in the DIM. Implications to college teaching are discussed.

Keywords: *classroom fit, developmental instruction model, environmental types, epistemological development, log-linear analysis, SETA*

Introduction

While the number and diversity of students in higher education has increased, the basic mission of providing postsecondary education has been consistent over the centuries. Not only does a college education involve attainment of more advanced knowledge than was gained in the secondary school setting, it must also entail changes to the way students think about and understand what they are learning. That is, students engage in increasingly more abstract and theoretical material as they progress so that they have the capacity to create and defend solutions to the complicated and ill-defined problems that they may encounter after graduation. Although college professors are responsible for creating an atmosphere that supports growth on both these dimensions, this study focused on one tenable model for facilitating the cognitive complexity of students.

Of the frameworks that have sought to explain this transformation in learners' thinking abilities, Perry's (1998/1970) theory of epistemological development is of particular relevance, having arguably transformed many of the strategies by which college students have been educated over the past four decades (Evans, Forney, Guido, Patton, & Renn, 2010; Pascarella & Terenzini, 2005, West, 2004).

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By taking a cognitive-structuralist approach, Perry identified sequential and hierarchical changes in how students "know what they know," based on their experiences in college. Much of the subsequent research on the Perry scheme has involved documenting these changes and how they can inform college teaching, although cross-cultural studies have not been extensive (Zhang, 2004).

Later work by Knefelkamp (1998) explored instructional characteristics specifically. The resulting developmental instruction model (DIM; xxiv) captures what she saw as the salient classroom processes that facilitated epistemological development. Unfortunately, the validity of the DIM approach, although promising, has not been well demonstrated (Evans et al., 2010), due most likely to the lack of a way to operationalize it (addressed in the next section). This research project was conducted to help fill this gap with an alternative measurement strategy and to extend the work on the Perry scheme. Specifically, he noted that, as students become more advanced knowers and learn how to learn, they begin to recognize the types of processes that support their growth. If this assertion is true and the DIM describes a valid set of those processes, then advanced students should show stronger preferences for them than their first-year peers.

Epistemological Development and the DIM

Rather than recount a commonly known theory and duplicate the works of others (Evans et al., 2010; West, 2004), a brief discussion of the four developmental positions is provided here (see Table 1). Relying on an absolutist and concrete view of the world, *dualistic* (received knowledge: positions 1 and 2) students prefer to focus on obtaining the "right answers" in situations and rely on educators to provide them. Their perceptions and judgments are grounded in overt environmental cues and structure. Most traditional-age college matriculates are in dualism and tend to move into later positions during college (Perry, 1998/1970). *Multiplistic* (subjective knowledge: positions 3 and 4) students function better in a less structured setting because they can see multiple sides of issues and seem to prefer academic environments that allow some freedom of thought and evaluation. *Relativistic* (procedural knowledge: positions 5 and 6) students begin to see that all sides are not necessarily equal and seek ways to defend particular viewpoints. Finally, building on these epistemological skills, students in *commitment in relativism* (constructed knowledge: positions 7, 8, and 9) find dissonance in the world around them and act to create structure and to make meaning themselves, unlike their dualistic peers who seek it in the environment.

Knowing how students develop and supporting that process are different matters, however. To elaborate on Perry's notions, Knefelkamp (1998) identified four classroom characteristics that facilitated movement through the positions. The level of *experiential* learning can vary from direct to vicarious experiences, with more direct involvement supporting the movement through the positions. The level of *diversity* can challenge students to develop more complex ways of making meaning by varying both the quantity and quality, which can also vary from simple to complex. To form a safe environment for learning, educators can maintain *personalism* by showing enthusiasm for the material and students, which is an especially critical need for learners in the earlier positions. Finally, the *structure* or level of direction given to students can be varied to challenge students to grow. Students in lower positions typically need more structure than those in the higher positions, who need support with learning to make their own structure.

Table 1: *Summary of the Perry's Positions of Epistemological Development*

Positions	Students' Relationship to Learning
1 & 2 Dualism	Received knowledge Students view all knowledge as known; focus on obtaining the "right answers" and rely on educators to provide them
3 & 4 Multiplicity	Subjective knowledge Students see that knowledge conflicts sometimes; expect a less structured setting with some freedom of thought and evaluation, because there is often a diversity of views
5 & 6 Relativism	Procedural knowledge Students learn reasoning methods to know the unknown; prefer a setting where competing solutions must be evaluated and answers supported and where educators are resources and provide necessary feedback on performance
7, 8, & 9 Commitment in relativism	Constructed knowledge Students understand that knowledge relies on an integration of the subjective and objective; must take responsibility for their knowledge, and educators are no longer necessary

Note: Adapted from Perry (1998/1970)

Knefelkamp's (1998) model provided an important contribution by expanding this developmental theory into one that is more consistent with the person-environment interaction paradigm that undergirds much of higher education practice (Baird, 1988; Evans et al., 2010; Strange & Banning, 2001). That is, rather than discussing the development of individuals in isolation, educators have a broader framework for seeing how academic environments interact with students to produce learning and development. Unfortunately, although an interactional approach does seem to improve the understanding of epistemological development (e.g., Fruge & Ropers-Huilman, 2008; Schrader, 2004), only a handful of studies have fully employed the DIM (e.g., De L'Etoile, 2008; Hill, 2004; Kronholm, 1994), and apparently there has been no published research in the past few years. One possible reason may be the lack of a means to operationalize and measure the four key factors in the model, which can then be deployed to conduct research into this phenomenon. To address this deficit in this study of undergraduate student experiences in the classroom, environmental type theory (Salter, 2012, 2000b) and its related instrument were used.

Environmental Type Theory

Environmental type theory (Salter, 2012) has emerged as way to describe and measure behavioral environments, with an ostensive goal of supporting the use of another popular methodology in higher education: Jung's (1971/1921) theory of psychology types and the Myers-Briggs Type Indicator® or MBTI® (Briggs & Myers, 1998; Myers, McCaulley, Quenk, & Hammer, 1998). Although this particular research project was not about psychological type, per se, Jungian theory does appear to have relevance to Perry's assertions. For example, Piper and Rodgers (1992) noted that the functioning of these positions in the Perry scheme appears intimately related to personality style as described by Jung. Such findings are understandable, as both theories address aspects of students' orientation to a setting, perceptions of a setting, evaluations of those perceptions, and translations of those evaluations into behaviors. And, it is worth noting that Piaget, whose writing on cognitive development provided the background for Perry's work, studied Jungian theory during his nascent academic career (Ginsburg & Opper, 1969).

The four dimensions of environmental types parallel those in the psychological model (Salter, 2012, 2000b) and align with the constructs in the DIM (Table 2). Consistent with the DIM's experiential component, *extraverted* environments "pull" people into the action with presses toward involvement and interaction. *Introverted* environments, however, "push" responsibility back to the individual for the quality of the interactions, thus allowing for reflection and consideration of experiences. *Perceiving* processes accentuate the process of generating more elements—the pieces and parts of the environment. Where *sensing* environments focus on existing environmental elements (people, things, rules, or values) and reward people's attention to them, *intuitive* environments focus on creativity, discovery, and new relationships among elements, thus reflecting the diversity dynamic in the DIM. The *judging* processes concern formation of a collective reality in the environment, thereby providing the necessary structure, also noted in the DIM, by which individuals can make judgments. *Thinking* environments maintain objective sets of logical operations that are based on a central, depersonalized truth or science. In contrast, *feeling* environments rely on values and networks of connections to support a shared reality: the personalism component.

Table 2: *Alignment of Dimensions in the DIM and Environmental Types*

DIM	Environmental Types
Experiential The level of involvement in the classroom subject matter, ranging from direct to vicarious	Extraversion–Introversion This dimension addresses the bipolar nature of the relative obtrusiveness—the push/pull of psychic energy—in a behavioral environment
Diversity The types of choices and perspectives that are provided to students in the classroom, which can vary in both quantity and quality	Sensing–Intuition This perceptive environmental function reflects a convergence/divergence dichotomy—a focus on the elements in a setting or on the associations between elements
Personalism The level of psychological safety that supports exploration and risk taking, which varies from personal to impersonal	Thinking–Feeling This judging function aligns with the way that an environment maintains a reality, through either a logical/empirical or a value-driven/person-oriented approach
Structure The level of direction given to students, which can vary from a low to a high degree	Judging–Perceiving This dimension addresses the interactive functions within an environment: construction of a recognizable repertoire of elements and maintenance of a predictable level of organization

Note: DIM = developmental instruction model; adapted from Knefelkamp (1998) and Salter (2012)

The Salter Environmental Type Assessment (SETA) was created to measure the four dimensions of environmental types, and environmetric studies of its measurement properties continue to support the validity of the scores that it produces (discussed in Instrumentation). Much of the practical application of environmental type theory and the SETA has been in the college classroom and has utilized the person-environment interactional framework to study students' perceived "fit" with various types of learning environments (Persaud, 2003; Persaud & Salter, 2003; Salter, 2003b). A consistent finding across these studies has been the fact that student learning style (as measured by the MBTI) has only a very modest relationship to perceived fit. Instead, the combination of environmental extraversion, intuition, and feeling is a strong predictor of classrooms that students have reported as a good fit for them as learners, nearly irrespective of their individual personality preferences. Environmental perception also has appeared related, but to a much smaller degree. One aspect that was not considered in these studies was how perceived fit with classroom styles may differ by the developmental level of the students, however. This alignment for further exploration became the vehicle by which to test both the efficacy of the SETA to measure DIM constructs and Perry's premise that students begin to recognize environmental characteristics that help them learn as they develop.

Research Question

This project was designed to be another step in understanding the relationship between epistemological development and the educational process, with a distinct focus on the learning environment. To test the contention that, as a result of their epistemological development, students begin to recognize the types of settings that support the learning process, a simple exploratory study was constructed that used the SETA to compare the perceptions of first-year students and advanced students. One primary assumption was that class standing can serve as a proxy for the differences that emerge during the college years. Hence, the hypothesis was that the expected pattern of preferences (perceived fit) for learning environments (toward extraversion, intuition, feeling, and perceiving) could be further understood using this simple distinction. That is, if their academic needs are consistent with their development and experiences, do advanced students have different preferences than first-year students for classroom environment types, as measured by the SETA and consistent with the constructs in the DIM?

Relevance to College Teaching

Perry's theory has long served as a cornerstone of higher education practice and college teaching. His theory provides a framework for both understanding the student learning experience and crafting developmental and academic interventions for college students. Although less widely known and utilized, Knefelkamp's DIM extends this conversation into specific characteristics of academic settings that facilitate epistemological development and offers some very particular strategies for enhancing it. A central assumption of this study was that environmental type theory and the SETA provide an alternative means to operationalize these basic processes for use in future research or evaluation studies. If so, the SETA provides a means to study these types of stylistic environmental constructs across multiple settings and opens the door to integrating personality into discussions of development even further.

Method

Participants

The sample was composed of 200 undergraduate college students who volunteered to participate in ongoing research as part of their educational experiences. The primary selection criterion was whether these students had completed at least one semester of postsecondary study at this small state university in the northeast United States. The ethnic/cultural breakdown for the sample was 182 White, 9 African American/Black, 2 Hispanic, 1 Asian American, and 4 multiethnic students. The sample group contained 121 women and 77 men; 2 students did not respond to either of the gender and ethnicity demographic items. No attempt was made to ascertain this convenience sample's generalizability to all college students, although the sample characteristics appeared consistent with the student body at this institution, which did not serve many nontraditional age students.

Instrumentation

SETA

The SETA was used to measure the four dimensions of environmental type theory, which were seen as aligned with the DIM dimensions (see Table 1). Creation of the SETA relied on a variety of strategies (Salter, 2000b). Some items reflected behavioral correlates found in MBTI research and others were based on emerging environmental type constructs. The version used in this study, a prereleased version of Form C (Salter, 2010), emerged from subsequent content and factorial validity studies of the scored and test items on Form B, with various samples. Each of the four SETA-C scales is composed of 19 response pairs, for a total of 76, in both phrase question (33%) and word pair (67%) formats. Similar to the MBTI approach, respondents must pick the item responses that better describe the environment being assessed. A differential between the subtotals of the two types of the responses is computed for each scale, ranging from -19 to +19. These differentials are used to sort scores into four dichotomous-type categories (extraversion–introversion or EI, sensing–intuition or SN, thinking–feeling or TF, and judging–perceiving or JP).

The reliability and validity of SETA scores have been addressed on several fronts over the years, with most published studies using the earlier 60-item Form B (Salter, 2000a) on which the current version was built. Using the generalizability theory technique (Brennan, 2001), scores produced reliability estimates ranging from .78 to .88 (Salter, 2003a), across four environmental domains (educational, group, work, and living). Construct validity studies of scale independence and artifactual effects from the MBTI instrument (Salter, 2000b, pp. 26–30) were conducted early in SETA development. SETA scores have also been shown to have concurrent validity in a number of studies with Moos' (1994) social climate assessments (Salter, 2002, 2008; Salter & Irvin, 2003; Salter & Junco, 2007) and of classroom environment (Salter, in press). Concerning factorial validity, a four-factor model was found to fit the data best in a confirmatory factor analysis of 1,000 SETA-B responses from college students (Salter & Vandiver, 2002). Finally, behavioral studies include examinations of the "chilly" classroom climate for women (Persaud, 2003; Persaud & Salter, 2003; Salter, 2003b) and stress in student affairs offices (Karras, 1990).

Procedure

Psychology instructors from seven different classes (one section of Introduction to Psychology, four sections of Child Development, and two sections of Lifespan Development) were approached to solicit their willingness to offer modest course participation credit for student involvement in an IRB-approved study. A research study packet was distributed to interested volunteers during class time, with both verbal and written instructions. Respondents were then placed on their own recognizance to complete the materials and asked to return them to the researcher within a week. All distributed research packets (205) were returned. Five students returned incomplete packets, which were removed from analysis.

To gauge their classroom preferences, students were asked to pick a previous class that they felt had been either a "good fit" or a "poor fit" for them as a learner, which was similar to the prompt used in earlier studies of classroom environments with the SETA (Persaud, 2003; Persaud & Salter, 2003; Salter, 2003b). The choice of classroom fit was left to the students, and they referenced it when completing the SETA. Participants were not required to reveal the actual classes that they used for their assessments to help assure candid and honest responses, but 139 (70%) volunteered this information about their choice (30 psychology, 20 language arts, 15 health/medical, 11 physical sciences, 10 mathematics, 10 biological sciences, 10 fine arts, 9 history, 6 sociology, 5 education, 4 political sciences, 4 philosophy, 3 recreation, and 1 each in computer science and first-year seminar).

Data Analysis

Working from the premise that advanced students may be more epistemologically developed than their first-year peers, respondents were sorted into two groups for purposes of data analysis: first-year students (n = 99) and upperclass students (n = 101, including 55 sophomores, 28 juniors, and 18 seniors). Employing the same strategy as in Persaud and Salter (2003) and Salter (2003b), the asymmetrical log-linear analysis (ALLA) technique was used for data analysis. ALLA provides a method to analyze multidimensional contingency tables of nominal-level data (2x2x2, in this instance) and can be used as a predictive technique (Kennedy, 1992; Salter, 2003c). In this study, four models were constructed to test how perceived fit could be predicted by class standing (CS) and classroom environment, as measured by each of the four SETA scales (EI, SN, TF, or JP). The sample size was not large enough to address interactions among the four SETA scales, however.

A predictive ALLA is a multistep process that uses the likelihood chi-square (L^2) statistic. To start, the mutual independence model is fit to ascertain whether the explanatory variables (CS and SETA scores) have any predictive relationship to perceived fit. If this null model L^2 is statistically significant, then each explanatory component (e.g., EI, CS, and EI×CS) is examined for its contribution by assessing its residual L^2 (similar in many ways to multiple regression). Because CS and each of the four SETA scores made meaningful contributions to predicting perceived fit, however, the null models were used to generate the standardized residuals (SRs) for the post hoc analyses. These SRs, which are distributed as z-scores, were used to pinpoint any cells that were statistically over- or underrepresented in the four multidimensional contingency tables. As multiple comparisons were being made in the final step, the a priori confidence level ($p < .01$) was divided by 8 (the number of cells in a contingency table) to establish a relatively strict criterion ($p < .00125$) for interpreting an SR as meaningful.

Results

Reliability estimates (alphas) for scores from this sample on each SETA scale were found to be acceptable for further analysis (EI = .88, SN = .75, TF = .86, and JP = .87). After leaving the choice to the student, 88 respondents (first-year = 35, upperclass = 53) identified classes that they felt were a poor fit for them as learners, and 112 (first year = 64, upperclass = 48) reported on courses that were a good fit. The tendency of advanced students reporting on more poor-fitting experiences may have been an indication that they had a wider range of experiences from which to draw. The EI (E = 108, I = 92) and TF (T = 109, F = 91) scales showed a relatively balanced representation. For the SN (S = 129, N = 71) and JP (J = 131, P = 69) scales, the distribution did have a slight tendency toward SJ (85), but it was not statistically significant. The ALLA technique controls for these types of distributional differences, however.

The L^2 for the null model was significant ($p < .001$) for each of the four ALLAs (EI = 102.82, SN = 53.09, TF = 113.75, and JP = 38.30). Because these findings suggested that predictive relationships to perceived fit existed for the four environmental type dimensions and academic level, each explanatory component was assessed for its contribution to the model. In all four instances, the CS residual was the same and modestly significant ($L^2 = 5.98$, $p = .01$). Statistical significance ($p < .001$) was observed for the residual L^2 components for each of the SETA scales (EI = 86.39, SN = 43.83, TF = 94.82, and JP = 31.20). No interaction terms were significant ($p < .01$), which would have suggested different directionality of effects in the findings. Therefore, to gain an understanding of the influence of CS and classroom climate on fit, the null models were used to generate the SRs. Table 3 contains all the SRs (z) from the four ALLAs, highlighting the ones that met the Bonferoni criterion ($p < .00125$).

Discussion

The ALLAs produced the expected findings regarding perceived classroom fit, for the most part, but not *different* patterns for the two groups. Instead, what appeared to be subtle trends for the newer students were more pronounced and often statistically significant ($p < .00125$) for the advanced students. On the EI dimension, even after controlling for distributional differences, poor-fitting extraverted classroom settings were significantly underreported by students in the first-year student group (SR = -3.33). Students in the upperclass student group showed that extraverted settings were much preferred (SR = 5.04) over introverted classrooms, which were significantly associated with poor fit (SR = -3.35). These findings appear to extend the previous studies of fit with the SETA (Persaud & Salter, 2003; Salter, 2003b). Generally, when psychological type has been included as a measure of learning style, both extraverted and introverted students have viewed a classroom that involves them in the learning process to be a good fit for them. In this case, however, primarily the advanced students seemed to have the stronger opinion on their perceived poor fit with introverted settings.

Table 3: *Standardized Residuals From the ALLA of Perceived Fit by CS and SETA Dimensions*

	First-Year Students				Upperclass Students			
	obs	exp	SR	*p*(*z*)	obs	exp	SR	*p*(*z*)
EI dimension								
Poor fit								
Extraversion	9	25.96	-3.33*	< .001	6	21.56	-3.35*	< .001
Introversion	26	17.60	2.00	.023	47	22.88	5.04*	< .001
Good fit								
Extraversion	50	33.04	2.95	.002	43	27.44	2.97	.001
Introversion	14	22.40	-1.78	.038	5	29.12	-4.47*	< .001
SN dimension								
Poor fit								
Sensing	30	25.96	0.79	.214	49	30.80	3.28*	< .001
Intuition	5	17.60	-3.00	.001	4	13.64	-2.61	.004
Good fit								
Sensing	29	33.04	-0.70	.241	21	39.20	-2.91	.002
Intuition	35	22.40	2.66	.004	27	17.36	2.31	.010
TF dimension								
Poor fit								
Thinking	34	21.56	2.68	.004	48	26.40	4.20*	< .001
Feeling	1	22.00	-4.48*	< .001	5	18.04	-3.07*	.001
Good fit								
Thinking	15	27.44	-2.38	.009	12	33.60	-3.73*	< .001
Feeling	49	28.00	3.97*	< .001	36	22.96	2.72	.003
JP dimension								
Poor fit								
Judging	15	29.04	-2.61	.005	24	28.60	-0.86	.195
Perceiving	20	14.52	1.44	.075	29	15.84	3.31*	< .001
Good fit								
Judging	51	36.96	2.31	.010	41	36.40	0.76	.223
Perceiving	13	18.40	-1.28	.101	7	20.16	-2.93	.002

Note: ALLA = asymmetric log-linear analysis; CS = class standing; obs = observed frequency, exp = expected frequency; SR = standardized residuals (*z*); EI = extraversion–introversion; SN = sensing–intuition; TF = thinking–feeling; JP = judging–perceiving
*meets the Bonferroni criterion of $p < .00125$, $z = 3.02$

For this sample of 200 students, only one statistically significant finding was related to the SN dimension. Advanced students found sensing classes to be a poor fit for their learning (SR = 3.28), which did seem consistent with expectations. Several factors may underlie these limited results. This ALLA had one of the smaller L^2 statistics for the null out of the four analyses, suggesting that the sample could have been larger and broader. Of particular note, an earlier study of this dimension (Salter, 2003b) included graduate students, although CS was not examined as a variable to understanding perceived fit. The SN relationship to perceived fit was more pronounced for that earlier sample, with many students preferring an intuitive classroom setting, regardless of their sensing or intuitive learning style preferences. With a higher proportion of first-year students in this sample, however, their limited collegiate experience may be restricting the range of potential responses. At this university, like many others, perhaps, the introductory courses for matriculates did not appear consistent with the more intellectually challenging upper-division seminars, which might be more reflective of environmental intuition. Perhaps neither group has had enough experience with the variety and range of intuitive college classroom settings to appreciate their impact on learning fully.

The TF dimension ALLA produced the most differentiated pattern related to fit, and one that parallels previous research with the SETA (Persaud & Salter, 2003; Salter, 2003b). Feeling characteristics were generally associated with a sense of positive fit for students, although the newer students had the significant finding (SR = 3.97). Poor-fitting feeling classrooms were underreported for both first-year and upperclass students (SR = -4.48 and -3.07, respectively). Conversely, the less personable, logically operated thinking classrooms were not perceived as fitting, especially for the advanced students (SR = 4.20 and -3.73). This recurring finding is consistent with the broader sociological dynamics within college classrooms, where the quality of interpersonal relationships can produce a variety of outcomes (Hirschy & Wilson, 2002). In this study, students at both levels reported preferences to feel personally connected to the classroom and to be treated as having value in its operation. Understandably, the smaller and more personal nature of this institution may be one reason that these students originally chose to attend it.

Finally, the role of structure in these students' experiences produced one notable result. Advanced students reported poor fit in perceiving classes (SR = 3.31). This particular finding seems inconsistent with epistemological development and the DIM, which would suggest that advanced students might see the educational merits of a perceiving classroom setting. Further consideration of this finding may help clarify the nature of this inconsistency, beyond the small L^2 component associated with the null model for the JP dimension.

Of particular note, these students reported on almost twice as many judging-oriented classrooms (131) than perceiving ones (69). This finding could be viewed as consistent with the distinct focus on undergraduate education at this institution, which might be expected to be more structured to reflect the needs of newer students. Additionally, the sample may not have been developmentally diverse enough to test this aspect of Perry's scheme, and neither group of these students could recognize the benefits of the more open-ended, free-flowing approach associated with advanced academic challenges. Hence, a perceiving process that potentially challenges students to construct their own meaning might have been viewed as a disorganized approach by students. Certainly, the overt differences between a disorganized instructor and an instructor using a less structured approach to teaching might be difficult to discern for students, especially those in dualism.

Limitations

Given its exploratory nature, this study may have been limited in a number of ways. First, the sample was composed entirely of students from various psychology classes at a single institution. Replication studies from other settings with a range of students from a variety of academic areas are needed. On the other hand, the homogeneity within the sample does strengthen the internal validity of the results. In light of the mission and the types of students who attend this institution, arguably the key difference between these two groups was the fact that one was more academically experienced (and likely older) than the other. Therefore, differences between the groups might be considered more reflective of developmental differences.

Also important to note is that neither Perry nor Knefelkamp suggested that students would come to appreciate and understand all these differences on the same schedule, as it were. Perhaps the more pronounced TF and EI findings were due to the fact that these students had been students for most of their lives and, as such, had had more experience with the personal dynamics of classrooms and their involvement in them. As noted above, engaging theory and solving ill-defined problems are more consistent with the challenges found later in a higher education, which may account for the more modest SN and JP findings. Mapping the environmental type profiles of courses at different points in the curriculum (e.g., introductory psychology vs. an advanced seminar) might help educators better understand the types of challenges that students face at different points.

The sample size was also too small to address any higher order interactions among the environmental dimensions, which have been observed in environmetric studies of the scores produced by the SETA (Salter, 2002, 2008, in press; Salter & Irvin, 2003; Salter & Junco, 2007). Additionally, two variables (perceived fit and CS) were used in all four models, thus inflating the opportunity for misinterpretation of the results. Although this study was not about students as individuals, collection of data on their epistemological positions and learning style preferences might reveal other meaningful outcomes. Certainly, the dichotomous CS variable was not sensitive to all the aspects of Perry's scheme and the developmental positions of students in either group. A wider range of the types of learners, especially graduate students, might add further insight into the ability of the SETA to capture the nuances suggested in the DIM.

Implications

Knefelkamp (1998) proposed four environmental dimensions in the DIM that she felt captured the processes that facilitated epistemological development. Unfortunately, no recognized measurement strategy for the DIM has been developed. From a theoretical standpoint, her conclusions appear to parallel constructs in environmental type theory (Salter, 2000b), which do have a related measure. The premises of this study were that the SETA presents one way to operationalize the dimensions of the DIM in a classroom and that this information can be used to understand the learning preferences of students at different points in their development. Although both student groups showed similar patterns, advanced students generally seemed to have stronger preferences for the types of academic settings that would be expected to move students toward more complex ways of thinking, as suggested by the Perry scheme. More work needs to occur around the role of structure in students' academic experiences, however.

Hence, educators would seem to have additional support for implementing the recommendations found in the DIM—and in classroom research involving the SETA—to assure student development. As demonstrated in this study, direct involvement in the learning process (environmental extraversion) is preferred by students and seems associated with perceived positive fit and growth. The opportunities for discovery and creativity (environmental intuition) should also support learning and development, even though neither group in this sample seemed to recognize this supposition fully, and, in spite of admonitions to college faculty to "keep some distance" from their students, developing those personal connections (environmental feeling) would seem to better achieve academic goals.

The findings related to structure (environmental judging) were less clear and may speak to the challenge of providing college-level education, in light of the range of learners. One way to frame the JP results could be that, although students may recognize what they need in their college experience, the stress of transition to a new academic environment may predict some regression to earlier ways of thinking, as Perry originally suggested. In spite of what is widely viewed as student and faculty consternation and dissatisfaction with the archetypal large-lecture format, that style of academic environment does respect the developmental positions of newer students on some level and may actually be providing a form of support. Educators will continue to be challenged to provide enough structure in educational settings to support learning, but not so much as to prevent students from developing the ability to define their own structure. More research on ways to facilitate and document that process is needed, certainly.

Summary

To understand the student experience more fully, this project blended together a number of theoretical notions, including epistemological development, pedagogical strategies, and environmental psychology. Such a strategy seems consistent with the day-to-day work of educators, as well. Although this study was exploratory on some level, one finding bodes well for faculty who are charged with the dual responsibility of teaching content to students and supporting their development as learners. If, as Perry noted, recognition is the first step to achievement, then students appear to develop an ability to recognize and to prefer the types of academic settings that would support their epistemological development.

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