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## Greetings from the new editor of JALT

Welcome to a new era for JALT. On behalf of the entire International Alliance for Learning, we thank Nancy Omaha-Boy for her years of service as Editor of the Journal and especially for establishing the on-line format that makes publishing so much more easy and efficient. Nancy was also a national president of IAL and has earned a well-deserved rest from the responsibilities of the editorial grind. Well done, Nancy, and thank you for agreeing to continue a relationship to JALT by occasionally reviewing articles.

I have just retired from a 26-year professorship that began after a stint at Iowa State University where I met Dr. Don Schuster and Charles Gritton, Allyn Prichard , and other early American pioneers of AL. As I look back now, attending the first AL conference was a landmark event in my life, since it included a two-day class in Italian taught by Evelina Gateva and Georgi Lozanov. In 1989 I served as your national president for AL in the Society for Accelerative Learning and Teaching, as we were then known, setting up the San Diego and Chicago conferences.

Over the years, the greatest treasure of the organization has been the Journal, because it is the repository of the documentation of the international movement to improve instructional effectiveness and to enhance the experience of learning. The Journal is the location of refereed articles that can be cited as definitive documentation with a permanent address. It has been a privilege to participate with so many good friends, keen intellects and energizing colleagues in such an uplifting endeavor. Every person in this movement has a stake in

assuring that the Journal record s the steady progress of documentation that can be referenced over the years. You would be amazed at the demand for readily accessible and up-to-date information for scholars and journalists writing about AL. Remember, in order to be remembered, referenced, known, shared, events and efforts must recorded.

I invite you to join in making the Journal an integral part of our network in several ways.

1. Whenever someone excitedly tells you of results, ask that the report be written and submitted to JALT.
2. If you know of someone who has recently written a dissertation, thesis, book, article, please send us the contact information , and a full reference, if possible.
3. If you have data or want to gather data for analysis and documentation, scholarly resources are available with in the organization to assist in analyzing and writing research studies.
4. I request that any scholars wishing to assist others in writing up such studies to please contact me so that an assistance registry can be established for easy contact.
5. Book review are always welcome. Reviews of older books are also needed so that newcomers can learn about sources.
6. We remind scholars that many articles and books are also to be found in ERIC , and are now available on-line.

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# Learning Styles of Students in Web-Based Instruction using the Preferred Learning Style Inventory (PLSI)

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**ABSTRACT**

The challenges of distance education continue in higher education. Despite the challenges, many institutions and instructors are using Web-Based Instruction (WBI). The purpose of the current investigation was to determine the learning styles of 54 students involved in distance education coursework (i.e., Art Appreciation) at a Mid-western university, using the newly-developed Preferred Learning Style Inventory (Keri, 2001). The results indicated that diverse learning styles were represented in this course, and that the instrument showed adequate construct validity in discriminating among eight preferred learning style categories.

## Introduction

Distance education will continue to pose challenges to higher education. For most instructors, fears of technology, concerns about authenticity of students' work, and lack of face-to-face interactions between students and instructors are a few of the many problems related to distance learning. In spite of these challenges, several institutions across the country are exploring with this new approach to reaching students who might not otherwise be accessed through traditional education.

In a recent study on designing effective instructional strategies for Web-enhanced courses, Dabbagh (2001) made the following observations in light of the trends in higher education:

1. Increasingly, higher education institutions and faculty members are feeling pressure to offer Web-based courses to meet economic and student demands, and to respond to the explosive surge of activity surrounding the development and use of WBI.
2. Despite the advertised ease of creating WBI using Web-based course management tools…faculty members and instructional designers working to meet this demand are discovering that the creation of WBI comes at a considerable price in terms of time, effort, and resources.

3. Many faculty members are engaged in transforming their current traditional classroom-based courses to a Web-based format ending with little more than another "version" of the same course. This suggests that there is an imminent need for guidelines to redesign such courses in order to "pedagogically re-engineer" them for Web delivery (Dabbagh & Schmitt, 1998).
4. No course providing such guidelines previously existed at any of the higher education institutions' Instructional Technology programs where these three faculty members were employed (Dabbagh 2001, p.34)

Distance education makes use of information age technologies to resolve many different needs of students. These technologies require a basic understanding of the characteristics and use of computer technology. Faculty members involved in distance education courses concede that the contexts and methods of instructional delivery in distance education do not conform to the traditionally captive audience formula. According to Lever-Duffy (1991), the methods of instructional delivery applicable to distance education can reach individuals whose location, personal circumstances, or family obligations would otherwise not allow them to elect classes. Additionally, Lever-Duffy contends that technologies and techniques of distance education include the following:

a. course correspondences
b. telephone

c. radio transmissions

d. audio cassettes

e. electronic mails

f. e-Conferencing

g. e-bulletin boards

h. telecommunication networks

Lever-Duffy argues that the goals of integrated distance learning systems should be about delivering effective instruction using necessary combinations of technologies. Consequently, the author makes the following recommendations to programs involving distance education: (1) not to be restricted to location and time, (2) avoid isolating learners from the benefits of the interaction with instructors and peers, and (3) to utilize as many deliveries as possible to address the learning styles needs of students.

Aitken (1994) reported that the Communications Studies department at the University of Missouri-Kansas City developed a computer package designed to teach and assess aural, visual, and oral communication skills of students through a multi-media approach with classroom test portfolios, and specific assessment strategies. The thrust of this instructional package was to adapt to two major trends in higher education: 1) ethnic sensitivity, and 2) interactive-media education. Some advantages thus far accrued from this investment are listed in the following enriched learning experiences for students: fostered student responsibility, used peer instruction, adapted to learning styles, taught computer literacy, gave examples of effective speeches, used module approach

and encouraged distance learning. Aitken concluded that this interactive learning or multi-media approach provided a viable instructional and assessment tool for communication studies.

Kelch and Karr-Kidwell (2000) argued that distance education is powerful for several reasons. The authors agreed that it fostered research writing, assisted teachers with instructional materials and their lesson plans, provided accurate record-keeping, and accommodated different student learning styles.

As to adult learners, Digilio (1998) examined the characteristics of adult learning and concluded that Web-based instruction provides the most flexible and conducive learning environments for adult learners. Digilio's examination of the literature of adult learners' experiences and distance education highlighted the view that adult learners encounter special learning restraints, possess certain learning motivations, and unique learning styles when compared to traditional college students.

Sattem, et al. (2000) alluded to limitless opportunities vis-à-vis distance education. A few of their comments were that, using technology, professionals are able to reach more people, individualize therapeutic approaches, access more resources, support different learning styles, encourage learners to become lifelong learners, and develop new skills and methods of interacting with clients and colleagues alike. However, distance education is not without concerns. There have been instances where instructional materials have been lacking, or uncertainties have arisen because of the nature of instructional packages, and/or difficulties have emerged as associated with managing and maintaining equitably

conducive learning environments for students. For example, Sattem, et al., argued that there are crucial challenges facing distance education such as time, resources, ownership, recognition, promotion, accreditation, focus on the individual learner, and professional development needs. Other investigators of distance education have found additionally disturbing problems related to the implementation of distance education courses.

Scriven (1991) concluded that instructional materials for distant education are limited. The author also referred to programs offered through overseas universities where tutorials appear limited because of infrequent visits by foreign universities and local organizations, such as the collaborative Bachelor of Health Sciences (Nursing) program. In the same vein, Ching (1998) has argued that distance education promotes the kind of learning that fosters one-way instructional channels, such as tutorials that assume the forms of written assignments, essays, and telephone conversations and computer communications.

Bamberg (1981) observed that learning environments in distance education courses are unpredictable, changeable and complex. Keagan (1990) noted that the nature of instructional packages and the number of communication contacts varies in different distance education programs. As a result, Keagan then analyzed variations in distance-education groups in light of the nature of instructional packages and the frequency of communication contacts, and concluded the following:

1. e-learning is very impersonal

2. instructional packages are sent to students who study and complete assignments on their own
3. relationships between teachers and students provide “nil contact” (p.26)
4. Learners and teachers are consistently not in a face-to-face relationship, and a substantial amount of information is passed on to students in writing.

## Increased Attention to Learning Styles

Bundy (1998) examined the potential of asynchronous learning networks as a viable training alternative for small and medium manufacturing businesses. Bundy made the following conclusions: (1) distance learners differ in their learning styles, (2) distance learning initiatives tend to have higher attrition rates than other forms of learning; and (3) more traditional teaching variables (involving teacher interactions and curriculum) have a greater impact on student success than any learning technology.

The recognition of the challenges facing distance education students has accelerated the use of learning styles to address instruction and learning needs. Since the validity of interactions between learning styles and distance education are still debated, examination of teaching and learning data from the standpoint of learning styles is needed relative to (1) whether or not certain students do better in distance education than in traditional classrooms, and also (2) whether

or not there are factors more compelling in examining learning needs of students beyond the value of deciphering learning style profiles.

Diaz and Cartnal (1999) conducted a study comparing social learning styles of distance education students to a comparable traditional on-campus group (N=63) in health education classes. Using the *Student Learning Style Scale* (Grasha and Reichmann, 1974), the results revealed that the students involved in the distance learning course favored independent learning styles, whereas students in the on-campus class were significantly more dependent, and collaborative.

The argument has been that field-dependent students are influenced by their physical and social backgrounds. As a consequence, field-dependent students are less able to rely on their own judgments, organize their learning activities, and focus. Field-independent students, in contrast, possess clearer learning focus, are analytical when approaching intellectual problems, demonstrate stronger values, maintain a more defined sense of autonomy, are more logical, and prefer to engage more in abstractions (Donnarumma, Cox & Beder, 1980; MacGregor, Shapiro, & Niemiec, 1988). Holmberg (1989), however, maintains that it is the separation and independence of the learner from the instructor that defines the learning environment of distance education. Hence, self-directed learning may be a function of the environment created by the nature of distance education itself, and not to attribute the acquisition of this style to the very nature of distance education.

With a similar intent, Vermunt (1996) sampled a number of freshmen from an open, distance-learning university (n=34) and a traditional university (n=20) and interviewed them about their cognitive strategies, regulation of learning, mental models of learning, effective processes concerning learning, learning orientations, and perceptions of effectiveness of instructional approaches. The following styles were identified as favoring distance education students: reproduction-directed, meaning-directed, and application-directed. Perhaps, the controversies affecting learning styles and distance learning may need to be subordinated by whether styles produce better student academic achievement outcomes.

Gee (1990) examined effects of students' preferred learning styles on students' perceived academic achievement, attitudes toward learning contexts and course completion rates in distance education settings. In this experiment nine female graduate education students attended weekly classes on the Texas Tech University campus in Lubbock, and seventeen other female graduate education students attended weekly classes at a remote distance learning site in Odessa (Texas). The two groups of students were taught simultaneously, using the same course content and Canfield's *Learning Style Inventory* was administered for pre and post-test comparisons. The author concluded that learning styles affect students' academic achievements and attitudes in general, and thus recommended that instructors vary instruction to identify with variant learning needs of their students.

Question: Should there be a careful planning and implementation of distance education courses, considering the dynamics of learners? This question may have been addressed by the results of Granger and Benke (1995).

Granger and Benke (1995) concluded that multiple “distances” were to be navigated in distance learning programs. According to the authors such “distances” include knowledge levels of learners, learners’ ability to transfer their acquired knowledge, learners’ linguistic abilities, learners’ cultural backgrounds, learners’ learning contexts, and learners’ learning styles and goals, as well as learners’ motivations. Researchers continue to suggest better ways of using learning style information to improve instruction in distance education courses.

James and Gardner (1995) referred to several relevant factors to be considered in using learning styles in distance education: theoretical framework of the learning style instrument, intended use of the information garnered from the instrument, whether the instrument matches the intended usage of the data, and selecting the most appropriate instrument based on such variables as reliability, validity, administration difficulties and cost.

Using Rechmann and Grasha’s (1974) *Learning Style Scale*, Aragon et al., (2000) discovered rather significant relationships between learning style preferences and course success on five constructs regarding face-to-face students, and no such relationship was evident among the students who were situated online. Hence, to make the argument first that students of certain learning styles are drawn to distance education courses is to ignore (or overlook) other possibly penetrating explanations such as their personally admissive

statements regarding their involvement in distance education courses. Second, in order to make a strong case that students' learning styles are predictive grounds for deciding whether to enroll in distance education courses, there must be an opportunity to control for those potentially explanatory and competing factors, such as where students' live as to their proximity (or not) to traditional institutions, course availability, convenience and others as those may compete for students decision whether to involve in distance education courses. For instance, one could make the argument that other motivational indices rather than learning styles *per se* are stronger reasons for students' participation in distance education courses. The stated considerations are important (and, must be accounted for or controlled), or else research conclusions are nothing more than educated guesses, or merely situational opinions.

While a limited numbers of studies have investigated the learning style of distance education students, there have yet to be experimentations with Keri's Preferred Learning Style Inventory (PFLI) in terms of its ability to differentiate among learning styles of students. The purpose of the current investigation was to determine the learning styles of students involved in an Art Appreciation distance education course. The questions important to this investigation were as follows:

1. Do students with certain types of learning style preferences gravitate toward distance education?

2. Are distance learning students' learning styles clearly differentiated from each other, according to the eight categories defined by this new inventory (KPLSI)?
3. Are subscales of KPLSI valid in their ability to differentiate among learning categories?

## METHODS

*Sample*

At the end of the Spring 2002 semester, 54 students enrolled in an Art Appreciation distance education course at a mid-western university participated in this investigation. Of the 54 Art Appreciation students, 77.8% were females, and 22.2%, males. Within this distribution, 11.1% were first-year students, Sophomores 37%, Juniors 20.4%, Seniors 27.9% and Non-degree 1.9%. The mean age of the students was 29 years, and the averaged cumulative self-reported grade point average was 2.67.

*Instrument*

The new *Preferred Learning Style Inventory* (PLSI) (Keri, 2001) is a 40-item Likert-type 1-5 scale ("1" the least preferred, and "5" most preferred). The Preferred Learning Style Inventory categories are as follows: Participatory, Solitary, Global, Particularistic, Sensational, Stoic, Analytic, and Superficial. Participatory learners prefer to learn in groups; Solitary learners like to learn alone; Global learners prefer to be broad-based learners; Particularistic learners function best with specifics; Sensational learners prefer to infuse rhythms in the learning material; Stoic learners prefer no noise in the learning environment; Analytic learners are more procedurally and systematically-minded; and Superficial learners are on-the-surface learners. There are five items to each profile category. The highest cumulative score on all five of the items in each profile category (with maximum: 25) determines a respondent's most preferred

learning style profile. Cronbach's alpha of internal consistency reliability for each of the eight profiles as was calculated on 800 college students in the fall of 2001 were as follows: Participatory .5938, Stoic .6934, Analytic .7682, Global .6264, Sensational .4885, Particularistic .4908 Solitary .5536, and Superficial .8059 (Keri, 2001). These levels of internal reliability are adequate for purposes of the inventory.

*Procedures*

A Web site was created for a *Preferred Learning Style Inventory* (PLSI) for students enrolled in an Art Appreciation distance education course. Students were encouraged to participate in the course to assist the instructor to better understand their unique learning needs. Directions to fill out PLSI were written in an easy step-by-step fashion to make the process the least cumbersome for the students. The instructor of the course sent out consent information via e-mail to all the students enrolled in the course to obtain their consent. Students who responded positively were issued passwords to allow access to the Website, and also to secure confidentiality of students' responses. On average, students spent 6 minutes to complete the survey online.

*Analysis*

For question 1 a descriptive analysis was performed in terms of the means and standard deviation of the learning styles of the 54 participants involved with the Art Appreciation course. As to question number 2 and 3, inter-correlations of

the items were compared using Pearson's Product Moment Correlation Matrix to determine whether the items of the PLSI overlapped relative to their designated categories.

## RESULTS

The means and standard deviations of the eight learning styles in the Preferred Learning Style Inventory (PLSI) are reported in Table 1.

Table 1

Means & Standard Deviations for Preferred
Learning Style Types of Distance Education Students

| Learning Style Types | N | Minimum Score | Maximum Score | Mean | Standard. Deviation |
|---|---|---|---|---|---|
| Participatory | 54 | 9 | 21 | 14.76 | 2.154 |
| Solitary | 54 | 11 | 22 | 15.15 | 2.460 |
| Global | 54 | 12 | 22 | 17.11 | 2.089 |
| Particularistic | 54 | 10 | 23 | 15.89 | 2.703 |
| Sensational | 54 | 8 | 23 | 14.15 | 2.666 |
| Stoic | 54 | 8 | 23 | 14.59 | 3.019 |
| Analytical | 54 | 8 | 25 | 17.65 | 3.303 |
| Superficial | 54 | 5 | 18 | 11.65 | 2.915 |

Note: The number of students in the Art Appreciation course representing each learning style type: Part. 10; Sol. 5; Glo. 9; Par. 5; Sen. 2; Stoi. 6; Ana. 12; and Super. 5; & Mix. 10.

The results of the descriptive analysis indicate that, for this Web-based course, Analytic (Mean 17.65, SD= 3.03) and Global (Mean 17.11, SD=2.09) learners were the strongest set. The second sets of scores were Solitary (Mean

15.15, SD=2.46) and Participatory (Mean 14.76, SD=2.15) learners. These two scores were closely followed by third sets of scores Particularistic (Mean 14.76, SD=2.703), Stoic (Mean 14.59, SD=3.019) and Sensational (Mean 14.15, SD= 2.67). The weakest score attained by the Superficial learners was (Mean 11.65, SD=2.92). Table 2 illustrates the results of the analysis.

Table 2 Correlation Matrix of the Eight Learning Styles Categories in the PLSI

| Learning Style Types | Part | Soli | Glo | Par | Sen | Stoi | Ana | Super |
|---|---|---|---|---|---|---|---|---|
| Part | | | | | | | | |
| Sol | -.43** | | | | | | | |
| Glo | .12 | .04 | | | | | | |
| Par | .00 | .05 | -.03 | | | | | |
| Sen | .25 | -.24 | -.11 | .09 | | | | |
| Stoi | .02 | -.07 | -.18 | .15 | -.26 | | | |
| Ana | .09 | .11 | .27 | .11 | -.11 | -.00 | | |
| Super | -.02 | .15 | .00 | -.34* | .07 | -.02 | -.43** | |

(*P<. 05; **P<. 01)
Note the following learning style categories: Par (Participatory); Sol (Solitary); Glo (Global); Par (Particularistic); Sen (Sensational); Stoi (Stoic); Ana (Analytic); and Sup (Superficial)

The inter-correlations of the categories of the newly-developed *Learning Style Inventory* (PLSI) indicate only three significant statistical relationships exist in the correlations between a few of the conceptual categories of the inventory. The results indicate that Participatory learning style related negatively to Solitary (r= -.43) at .01 level; Particularistic related negatively to Superficial (r= -.34) at

.05 level; and Analytic related negatively to Superficial (r= -.43) at .01 level. The three negatively moderate significant findings in the 25 possible comparisons point to two crucial issues: that conceptually the instrument is relevant, and that Keri's eight categories are not related, and are thus divergent.

## Conclusions and Discussion

This study demonstrates that varied learning styles are represented in this distance education course. Although a conceptually different instrument was use by Diaz and Cartnals (1999), where they reported that students of independent learning style are attracted to distance education courses, this study does not support such findings. The Solitary subscale of PLSI, by definition, should share some of the peculiarities of independent styles, yet the current study did not corroborate Cartnals' findings in this essential regard. Inasmuch as the current study demonstrates that there was no clear consistent pattern of preferred learning styles in this Web-based course, it showed that there were slightly more Analytic and Global learning styles present in this particular course. Hence, it may be somewhat intuitive, at best, to argue that students with certain learning style preferences enroll in distance education courses as argued by Diaz and Cartnals' (1999). At worst, such an argument might be an admixture of interpolations and intuitions. It is possible that the information that might be of importance to students attracted to distance education might be explainable in terms of their circumstances, location, proximity to an institution, demands in life, and other such competing situations. According to these data, the idea that

particular preferred learning styles determine a preference for distance learning is not warranted. Distance learners have diverse learning style preferences.

Determining learning style profiles of students in a distance education course at the outset might assist faculty to better understand the learning modalities of students represented in the said course. The fact that diverse learning style profiles were found among students in this Art Appreciation distance education course is to suggest that students who participate in distance courses are likely to possess varying learning style proclivities. In order to service students' learning style needs, instructors who teach distance education courses need to be aware of this diversity in students' learning styles, and must realize that the context of learning may well have little to do with students' learning styles considerations. This way, instructors are able to make conscious efforts at modifying their instructional approaches, or delivery styles to identify with the learning style characteristics of their students, learning contexts notwithstanding.

## Validity of the Preferred Learning Styles Categories

In terms of whether the *Preferred Learning Style Inventory* (Keri, 2001) is capable of differentiating among learning style types according to items comprising of each learning style category, the results clearly show that, at least, on a conceptual level the categories of the PLSI are antithetical and divergent enough for each of the categories to be independent in measuring different learning style constructs. As shown in the results, the higher a student's participation, the less solitary the student is; the more particularistic, the less

superficial; and, the more analytic, the less superficial. Clearly, these results are confirmatory of the potential existence of a fundamental structure of bipolarity inherent in some of the categories of this preferred learning style inventory.

On the basis of the current findings, is it not plausible to think that there is a special, or even fundamental correspondence between dimensions of learning styles and the requirements of Accelerated Learning (AL)? A plethora of studies have examined characteristics of accelerated learning, and made arguments for a link between elements of learning styles and dynamics of AL as to promote student success (e.g., Meyer, 1997). This meaningful link between AL and learning styles is really about the question of efficiency in teaching, unless one takes a distorted view of AL as can be only characterized as speedy instruction. This link may also suggest that teaching and learning must enjoin perspectives of both instructors and students in shaping learning and teaching environments, delivery systems and methods, provision of reinforcements within the learning environment, and (in some special circumstances) individualization of instruction to assist students to achieve academically. Thus several implications obtain for instructors and students regarding the current analysis.

## IMPLICATIONS

Because the decision to engage in distance learning involves a complex set of interacting variables such as distance between where students live, students' proximity to schools, course availability, and students' work schedules, instructors teaching distance education courses should not gear their instruction

to a population of students with certain learning style preferences. Instructors are to seek to diversify instruction to address the varying needs of students, knowing that varying learning style preferences might be represented in online course offerings. Further, it is within reason for instructors to feel encouraged to use learning style tools to assess students' learning style profiles in their distance courses to compensate for the lack of likely benefits (such as vicarious learning and modeling that could occur) related to interactions between students and instructors (and among students) in traditional classrooms.

It is also evident that there are clearly preferred learning styles of students. Given such differentiation, instructors who resign themselves only to traditionally didactic methods of teaching are likely to negatively impact the learning needs of students, especially where there is sufficient indication of a mismatch between learners' learning styles and instructors' styles of teaching. Indeed, there is little parallelism in thinking of challenging students to learn from differing learning style perspectives, when an instructor (1) has made no effort to understand the learning profiles of his/her students, (2) is both familiar and comfortable with maintaining his/her own personal method of instruction, or delivery style. In such a case, students will likely suffer as a consequence.

In view of the current findings, several issues may have to obtain relevant to the teaching and learning enterprise:

1. All instructors/teachers need to recognize the diversity of learning styles of learners within their courses/classes.

2. All instructors/teachers need to make the necessary efforts at ascertaining the kinds of learning styles present in any of their course/classes.
3. All instructors/teachers must have a reasonable obligation to endeavor to modify, adjust and streamline their courses/classes to identify with the learning style needs of learners.
4. All instructors/teachers are encouraged to use Keri's Preferred Learning Style Inventory in research regarding learning style dimensions of students, and to advance the critical importance of accelerated learning within the classroom (and outside).

The fact that this recently developed Preferred Learning Style Inventory shows acceptable internal reliability and construct validity in its conceptual quality to differentiate among learning categories makes it a useful application in teaching and learning in regular and on-line courses. Faculty, educators, administrators, teachers and students are encouraged to learn more about the learning style literature, and begin a dialogue about selecting those kinds of learning style instruments that have sufficiently valid and reliable psychometric properties. Future studies need to consider the relationships between students' learning style preferences and their academic concentration areas using the PLSI.

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