PERCEPTUAL MODALITIES: THE INTERFACE BETWEEN THE STUDENTS AND WEB-BASED LEARNING

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Abstract

The current trend towards online learning significantly alters the traditional paradigm for teaching and learning by shifting the focus away from speech and the printed word to the graphical user interfaces of the online learning environment. In the traditional classroom paradigm, visual and kinesthetic students are disadvantaged whereas it is auditory learners who are disadvantaged in the online setting. The scarcity of empirical research relating perceptual modalities to the online learning environment suggests that without looking at students’ visual, auditory, and kinesthetic learning preferences, the medium is neither being used to its fullest, nor are learners receiving the full potential of online learning. A study (N = 94) examining perceptual modality preferences—as determined by a VARK inventory—with regard to student use of online learning found a negative correlation between students' auditory preference scores and their use of WebCT. Conversely, there was a positive correlation between students' kinesthetic preference scores and their use of WebCT. The significance of this study lies in providing preliminary insight into how students with different perceptual modality strengths respond differently to an online learning environment, and may provide another focus to improve the quality of learning for online students.

Keywords - online learning, perceptual modalities, VARK, visual, auditory, kinesthetic.

1 INTRODUCTION

Computer-based technologies permeate our society. Few seem to question the many contributions of technological innovation and practices in our society and the same appears true of the role technology plays in the education arena. Many believe that education has always integrated technology into the classroom, be it the quill, the printed book, or the computer. However, the rapidly accelerating pace of technological innovations has educators integrating the next generation of electronic tools before we fully understand the pedagogical implications of earlier iterations.

The use of the Internet and Web-based applications have brought about a paradigm shift in education such that the distinction between classroom-based learning and distance education has become blurred. The speed of adoption of web-based learning may also have been helped along by increased ease of access, reduced costs, and the emergence of the Net Generation—a generation that is increasingly adept with developing technologies. But this comfort level with technology, where students seem to ‘learn more by doing’ appears to be in contrast to earlier generations of students who perhaps learned more by listening.

The Net Generation expects a high degree of interactivity and anticipates access to information from around the globe. They also expect independent investigation, collaboration, and peer contact which has led some to believe that this generation has a strong preference for technology [1]. This tech-savvy nature of the current generation of students is often promoted as part of the rationale behind the thrust into online learning. However, this practice is based on an assumption that lacks support, as generational differences do not appear to be a good single-factor predictor of learning or satisfaction [2].

There is a wealth of research discussing the flexibility of web-based, asynchronous learning, yet research on whether web-based learning is affected by various student characteristics (such as cognitive styles) seems to be absent in the literature [3, 4]. Without examining how technology
presents different aspects of online learning relative to how students acquire information, the technology is neither being used to its fullest, nor are learners receiving the full potential of online learning [5, 6]. To this end, this paper examines and discusses the findings from an investigation undertaken to examine students’ perceptions of their online learning from the point of view of their cognitive learning style—specifically, whether a relationship existed between students’ preferred mode for acquiring information (visual, auditory, reading, and kinesthetic perceptual modalities) and their comfort, use, and satisfaction with an online environment as a suitable mode of instruction.

2 A CONCEPTUAL FRAMEWORK

It is widely accepted that modern technologies allow for greater access and retrieval of information but while technology keeps expanding the potential for online courses, technology is only one part of the picture. Despite the ability of technology to provide more information and quicker communications, technology cannot hurry the process by which the human mind receives, processes, and integrates the information provided [7]. Ultimately, how learners acquire information varies person to person based upon unique perceptual differences or cognitive style.

The concept of learning styles has been the subject of harsh criticism [8, 9]; however, using perceptual modalities (visual, auditory, kinesthetic, olfactory, and gustatory) has a high face-validity because of its practical clarity [10]. Perceptual senses are the means by which individuals extract information from their surroundings. Indeed, they are our only interface between the environment and our brain, and as such, they play a key role in learning [11].

While all of our perceptual modalities are constantly scanning our surroundings, the olfactory and gustatory senses (smell and taste) are generally not significant in acquiring information for most academic subjects [12]. The most common modes for exchanging information in our traditional face-to-face classes are speech and the printed word [12, 13, 14]. Fleming [13] and Sankley [14] were of the opinion that two perceptual modalities are disadvantaged by this traditional teaching paradigm: the visual and kinesthetic modalities. In an online learning environment, Jacobson [12] argued that it is the auditory modality that is disadvantaged, as this modality is not well served by either the text-based nature of most online learning or the graphical user interface of online software. However, Herring [15] has speculated that since much of online learning is based on interactive communications (e.g. discussion groups, e-mail, or real-time chat) that students preferring traditional classroom discussions should be comfortable with online discussions.

With the recent evolution of Web 2.0 applications, synchronous online learning has evolved beyond it's predominately text-based origins [16]; but, given that text still has a strong presence in many online courses, the verbalizer/imager construct appears fundamental to the relationship between cognitive styles and online learning. Verbalizers are superior at working with textual information whereas imagers are superior at working with graphical information [17]. However, based on the work of Neil Fleming’s Visual-Auditory-Reading-Kinesthetic (VARK) model and Howard Gardner’s Multiple Intelligences model, it has been recognized that some students demonstrate preferences for other modes of information acquisition, such as auditory and kinesthetic [18]. As audio components become more common in online courses, preferences for auditory modalities must now be considered in any correlation of perceptual modalities and online learning. For this reason, this study used the VARK model as a way to assess students’ cognitive style preferences since VARK considers not only verbal and image preferences, but also auditory and kinesthetic preferences.

The VARK model is fundamentally the same as the VAK model; except Fleming [19] recognized that acquiring information from reading textual material was qualitatively different than acquiring information from iconic representations of information. Although both text and graphics are sensed visually, Fleming stated that there is a significant distinction between the ability of some students to work with graphic material as compared to textual material. This distinction between the brain’s handling of textual versus graphic representations is reinforced by Wolf’s [20] description of what reading demands of the brain. Accordingly, visual, auditory, reading, and kinesthetic learners are defined as follows:

- Visual learners acquire information most effectively when information is seen in the form of images such as charts, tables, graphs, flowcharts, and arrows or other notations that instructors could use to represent words,
• Reading learners acquire information most effectively when information is presented symbolically using text,
• Auditory learners acquire information most effectively through the spoken word as they acquire meaning from the use of tone, pitch, and other paralinguistic nuances such as body language,
• Kinesthetic learners acquire information most effectively when presented through experience, imitation, practice, and simulations as these learners understand best through the sense of position and movement of the limbs and the sense of muscular tension in relation to each other (proprioception).

3 PURPOSE OF THE STUDY
The purpose of this research was to investigate whether a relationship existed between students' visual, auditory, reading, and kinesthetic perceptual modality preferences and their comfort, use, and satisfaction with the online instructional environment. This question is very important for two reasons: 1) there is a scarcity of empirical research relating perceptual modality preferences to online instruction; and 2) there is a tendency for instructors' presentations to be biased by their own learning preferences, perhaps to the disadvantage of learners with significantly different learning styles. Learners are individually different, yet it has suggested that 70% of all learners are able to cope with a teacher's style of instruction regardless of the format in which instruction is presented [19]. But what of the other 30%?

The majority of Internet sites do a good job of presenting information visually. However, it is worth noting that students with a dominant unimodal visual preference represent only 3% of the population. If students with bimodal and multimodal preferences are included, visual learners still only account for about 30% of the population [13]. Therefore, without looking at students' perceptual modality preferences as they relate to online instruction, the medium is neither being used to its fullest, nor are learners receiving the full potential of online learning.

To examine the relationship between students' perceptual modality strengths and online instruction, three research questions were posed:

1. Was there a significant correlation between students' perceptual modality scores and their use of WebCT
2. Was there a significant correlation between students' perceptual modality scores and their perceived comfort levels with the types of computer tasks students may encounter when using WebCT?
3. Was there a significant correlation between students' perceptual modality scores and their perceived satisfaction with the various aspects of WebCT?

4 RESEARCH DESIGN
The research conducted was aimed at examining students preferred mode of acquiring information vis-à-vis student's use, comfort, and satisfaction in an asynchronous web-based online instructional environment. To reduce the bias associated with student self-selection (i.e. not registering for a web-based course), a compulsory course was selected that employed a blended format. The main components of the course were delivered in the traditional face-to-face format but assignments, course resources, discussion forums, enrichment materials, and grades were posted using WebCT.

4.1 Participants
The target group for this study consisted of students in the Faculty of Education at a small university in mid-western Canada and was conducted over two terms. Participants in this study (N = 94) had all completed a minimum of a Bachelor's degree. They were registered in one of four sections of a middle-years (grades 5 – 8) mathematics methods course within a two-year post-baccalaureate program leading to a Bachelor of Education and teacher certification. This group of students had a high level of pedagogical awareness, and perhaps because of this, may have been an optimal group to study as they were aware of the implications of a teaching/learning mismatch.
4.2 Procedure and Instrumentation

Data collection involved a one-time response to a questionnaire that required approximately 15 minutes to complete. The questionnaire consisted of three parts: a demographic section, a section about perceived comfort and satisfaction with their online experience, and a section on perceptual modality preferences.

The demographic section of the questionnaire collected data regarding: age, gender, student marital status, student employment status, and student enrollment status. Additionally, data were sought on the availability of a suitable computer at home, the type of Internet access from home, and years of experience with computers and the Internet. The perceptions section of the questionnaire consisted of seventeen 5-point Likert-scale questions about students’ perception of comfort (5) and satisfaction (12) with the online component of the course.

WebCT usage statistics were obtained from the WebCT server, including the number of content pages read, the number of bulletin board pages read, and the number of posts made to the WebCT bulletin board. The number of e-mails sent to the instructor via WebCT was counted manually. The number of hours participants used WebCT each week was a self-report item on the questionnaire.

The perceptual modality preferences of students in the study was measured using Zhang and RiCharde’s Learning-Think Styles Inventory© (1998), as the authors provided test/retest reliabilities and standard error of measurement. The perceptual preferences (VARK) section of the inventory consisted of eleven items in which the respondent chose from four possible means for receiving information: visual, auditory, reading, or kinesthetic. A score for the preferred mode for receiving information was determined based on the sum (count) of the responses in each perceptual modality category.

5 DATA RESULTS AND ANALYSIS

The information provided by students about the availability and usage of a computer indicated that the participants in this study had an adequate computer at home (95%) with high speed Internet access (67%). Typically, the respondent was female (69%), 23 years of age, had been using a computer for 13 years, and the Internet for 8 years.

Based on a self-report item on the questionnaire, the typical respondent in this study used WebCT about 1.6 hours per week over the duration of the course. In that time, the WebCT log indicated that she read or re-read an average of 227 content pages, read or re-read 63 topics on the bulletin board, posted 3 items to the bulletin board, and sent the instructor an average of 6 e-mail messages.

Perceptual modalities (VARK) scores were used to establish a profile of learner strengths. Analysis indicated that overall, students in this course had strength as kinesthetic learners and had mild visual and auditory strengths with low reading preferences (table #1).

Table 1 Means, Ranges, and Standard Deviation of Perceptual Modality preferences

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Range</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visual</td>
<td>3.0</td>
<td>0 – 8</td>
<td>1.73</td>
</tr>
<tr>
<td>Auditory</td>
<td>2.4</td>
<td>0 – 10</td>
<td>2.48</td>
</tr>
<tr>
<td>Reading</td>
<td>0.9</td>
<td>0 – 8</td>
<td>1.58</td>
</tr>
<tr>
<td>Kinesthetic</td>
<td>4.8</td>
<td>0 – 10</td>
<td>2.59</td>
</tr>
</tbody>
</table>

5.1 Analysis of the Data

This investigation was undertaken to examine the influence of student’s preceptual modality strengths on their comfort, use, and satisfaction in a text-based online learning environment. All correlations involving perceptual modalities (VARK) preferences were based on raw scores. However, certain demographic factors have been implicated as being factors that might mask or otherwise mitigate a direct correlation between perceptual preferences and the three research questions. To this end, a Pearson chi-square ($\chi^2$) or Pearson correlation coefficient ($r$) was calculated, as appropriate, to determine if any of the demographic factors impacted on each specific research question. The data were then examined using a partial Pearson correlation coefficient ($r$), accounting for the mitigating factors identified for each particular question.
5.2 Research Question 1

Was there a significant relationship between students’ perceptual modality scores and their use of WebCT?

For this question, server statistics were used to determine students’ use regarding three types of tasks commonly associated with online learning:
- Number of content pages read;
- Number of bulletin board pages read; and
- Number of posts made to the WebCT bulletin board.

Additionally, consideration was given to the:
- Number of e-mail messages sent to the instructor via WebCT; and
- Number of hours participants used WebCT each week.

Age, gender, marital status, and student enrollment status were not significant demographic factors relative to students’ use of WebCT. However, one pair of correlations was identified as significant relative to student employment status:
- There was a negative correlation between the number of hours of paid employment and the number of e-mails sent to the instructor \((r = -0.249, p = 0.015)\), and conversely
- There was a positive correlation between the number of hours of paid employment and the number of content pages accessed \((r = 0.214, p = 0.038)\).

Having a computer at home, the type of Internet access, and the number of years using a computer were not significant factors relative to students’ use of WebCT. The number of years students had been using the Internet was significant:
- There was a negative correlation between the number of years using the Internet and the number of content pages accessed \((r = -0.218, p = 0.035)\).

Based on the mitigating factors identified for this first research question, analysis was done using a partial Pearson correlation coefficient \((r)\), accounting for the specific factors that were found to be significant relative to student’s use of WebCT. One pair of correlations was found to be significant at the 0.05 level:
- There was a positive correlation between students’ kinesthetic scores and the number of content pages students accessed \((r = 0.312, p = 0.003)\), and
- There was a negative correlation between students’ auditory scores and the number of content pages students accessed \((r = -0.310, p = 0.003)\).

5.3 Research Question 2

Was there a correlation between students’ perceptual modality scores and their perceived comfort levels with the types of computer tasks students may encounter when using WebCT?

For this question, students were asked to rate their comfort level regarding 5 types of tasks commonly associated with online learning:
- Accessing WebCT;
- Using WebCT’s internal e-mail;
- Sending attachments;
- Converting between file types;
- Downloading files.

Age, gender, employment status, and student enrollment status were not found to be significant demographic factors relative to student’s perceived comfort with online learning. Only one factor was identified as significant at the 0.05 level:
- Student’s marital status was noted as significant relative to student’s comfort accessing WebCT \((\chi^2 = 8.055, df = 3, p = 0.045)\). Married students were more comfortable accessing WebCT \((m = 4.68, n = 56, SD = 0.045)\) than single students \((m = 4.26, n = 38, SD = 0.921)\).

There were no significant findings relative to having a suitable computer at home or the number of years of experience with computers. The type of computer access from home (1 correlation) and the number of years of experience with the Internet (4 correlations) were noted as significant.
The type of Internet connection was noted as significant relative to student’s comfort downloading files \( (\chi^2 = 18.150, df = 8, p = 0.020) \). Students with high speed Internet access were more comfortable downloading files \((m = 4.50, n = 62, SD = 0.825)\) than were students with dial-up access \((m = 4.16, n = 19, SD = 0.834)\).

There was a positive correlation between the number of years experience using the Internet and student’s comfort downloading files \((r = 0.353, p < 0.001)\),

There was a positive correlation between the number of years experience using the Internet and student’s comfort sending attachments \((r = 0.350, p = 0.001)\),

There was a positive correlation between the number of years experience using the Internet and student’s comfort with WebCT’s internal e-mail \((r = 0.332, p < 0.001)\), and

There was a positive correlation between the number of years experience using the Internet and student’s comfort accessing WebCT \((r = 0.221, p = 0.041)\).

Based on the identified mitigating factors for the five types of tasks commonly associated with online learning, the second research question was examined using a partial Pearson correlation coefficient \((r)\). One correlation was found to be significant at the 0.05 level:

- There was a negative correlation between students’ auditory scores and their comfort level with accessing WebCT \((r = -0.223, p = 0.039)\).

5.4 Research Question 3

*Was there a significant correlation between students’ perceptual modality scores and their perceived satisfaction with the various aspects of WebCT?*

For this question, students were asked to rate their level of satisfaction with twelve aspects of the online portion of the course:

- Course syllabus being posted online;
- Course assignments requirements being posted online;
- Course handouts being posted online;
- Course Web links;
- WebCT’s Grade Book;
- WebCT’s internal e-mail;
- WebCT’s bulletin board;
- WebCT page layout;
- Submitting assignments electronically;
- Students posting their assignments online;
- Online interactions with the instructor; and
- Online interaction with other students.

There were no significant findings relative to age or gender. However, other demographic factors were noted as significant:

- Student’s marital status was noted as significant relative to their satisfaction with ‘handouts’ being available online \((\chi^2 = 9.601, df = 4, p = 0.048)\). Married students with more satisfied \((m = 4.32, n = 56, SD = 1.097)\) than were single students \((m = 3.48, n = 38, SD = 1.175)\).
- There was a negative correlation between student’s course load and their satisfaction with the bulletin board \((r = -0.224, p = 0.030)\),
- There was a negative correlation between the number of hours of paid employment and student’s satisfaction with WebCT page layout \((r = -0.252, p = 0.014)\), and also
- There was a negative correlation between the number of hours of paid employment and student’s satisfaction with submitting assignments electronically \((r = -0.332, p = 0.001)\)

There were no significant findings relative to the number of years students had been using the Internet or the type of Internet connection. Significant findings were made relative to having a suitable computer at home and the number of years students had been using the Internet.

- Having a suitable computer at home was noted as significant relative to their satisfaction with their interactions with other students \((\chi^2 = 16.910, df = 5, p = 0.005)\). Those who had a computer at home were less satisfied with their interaction with other students \((m = 3.16, n = 88, SD = 1.081)\) than were students who did not have a computer at home \((m = 3.36, n = 6, SD = 0.499)\).
• There was a positive correlation between the number of years experience using the Internet and student’s satisfaction with having the course syllabus available online (r = 2.31, p = 0.025).

Based on the mitigating factors identified for this last research question, analysis was done using a partial Pearson correlation coefficient (r), accounting for the specific factors that were found to be significant relative to students’ satisfaction with WebCT. As a result of this analysis, one correlation was identified as significant at the 0.05 level:

• There was a positive correlation between students’ reading modality preference scores and their satisfaction with web links (r = 0.242, p = 0.026).

6 IMPLICATIONS & DISCUSSION

Significant correlations were identified for three of the four modality preferences, suggesting that instructors of online courses should be aware of the relationship between perceptual modality and online instruction methodologies employed. Positive correlations were identified for learners with reading and kinesthetic strengths, though the implications of this latter correlation may not be positive. For learners with Auditory strengths, on the other hand, four negative correlations were identified, suggesting some degree of discomfort / dissatisfaction with web-based instruction.

The conclusions arrived at were based on the following findings:

1. Learners with Reading strengths expressed satisfaction with web links to additional content (r = 0.242, p = .026).
2. Learners with Kinesthetic strengths accessed more content pages (r = 0.313, p = .003).
3. Learners with Auditory strengths accessed fewer content pages (r = -0.303, p = 0.004); accessed fewer discussion pages (r = -0.259, p = 0.017); posted fewer items to bulletin boards (r = -0.210, p = 0.049); and felt uncomfortable accessing WebCT (r = -0.223, p = 0.039).

6.1 Reading Learners

Given the nature of web-based links, it is perhaps not surprising that those with a higher reading preference scores were significantly more satisfied with hyperlinks than were learners with other perceptual modality preferences, as reading learners have a strong preference for text and clicking on a web link generally lead the user to another text-based page. If kinesthetic and auditory learners are to be equally enfranchised, would this be at the risk of disenfranchising reader/write learners?

6.2 Kinesthetic Learners

Students who had strong kinesthetic preferences (K = 6 or more) accessed an average of 263 pages as compared to auditory (187 pages), readers (201 pages) and visual learners (236 pages). Kinesthetic learners, however, did not differ significantly in the amount of time they used WebCT. This latter aspect has interesting implications for web-based learning as two possible conclusions appear feasible. Either kinesthetic learners are more efficient readers than other learners, or they are more impatient/superficial readers, spending less time reading the content of a page before moving on the next link. Attwood [23] commented on a similar phenomenon to that identified in this study, stating that when text on a computer was greater than two full screens, some reader’s attention span appeared to be inversely proportional to the length of the text.

In pondering a potential connection between kinesthetic and reading preferences, a Pearson correlation coefficient was calculated to determine the interrelations between the various perceptual modality preferences for the participants in this study. Accordingly, this analysis showed an inverse correlation (r = -0.351, p = 0.001) between students with kinesthetic and reading preferences, suggesting that those students with the strongest kinesthetic preferences had the weakest reading preferences.

If kinesthetic learners need to be able to move around, or alternatively, to see movement, then perhaps this might explain why they have a preference for acquiring information through the use of experience and practice. That experience may be simulated or real, as long as the individual is connected to reality, either through example, practice, or models [13, 24]. Based on this understanding of kinesthetic learners, it may be that they use the computer mouse seeking movement vicariously through the web links. Should this be the case, the implication may be that reading and
scrolling down a lengthy page of text is not necessarily an experiential learning activity, but essentially a reading activity with the mouse providing no more ‘activity’ than the turning of a page in a standard textbook. While text on a web page may be the way an instructor chooses to present course information, the findings of this study seem to lend support to the idea that different learners prefer to learn in ways consistent with their unique learning style, and that not everyone prefers acquiring information through reading.

6.3 Auditory Learners

In looking at the correlation between perceptual modalities and the web usage statistics, students with higher auditory preference scores accessed significantly fewer content pages, viewed significantly fewer discussion topics, and posted significantly fewer items to the discussion board, yet the amount of time they reported using WebCT was significantly more than the amount of time others users reported using WebCT. This would suggest that these learners are spending more time per page than other users.

Learners are individually different. Just as there are differences in an individual’s visual/spatial processing, there are also differences in how individuals process sound [25]. Auditory learners rely primarily upon information that is spoken or heard since these learners understand through listening and relate mostly to the underlying meanings of speech using tone, pitch, speed, and other paralinguistic nuances [13, 24]. Text is devoid of these verbal cues, so perhaps it is not surprising that auditory learners appear to have been spending more time processing text. This phenomenon clearly needs further investigation.

This finding brings into question the suggestion that students who prefer engaging in dialogue should be comfortable with bulletin boards, e-mail, and/or real time chat groups [26]. Traditionally, virtual discussion groups are not auditory, but based on Herring’s thought, there is the possibility that oral learners might be comfortable with discussion groups, in that they can ‘talk’ out their ideas. However, the initial findings of this study indicated that auditory students not only accessed the bulletin board significantly less than learners with other cognitive style preferences, but also posted significantly fewer items to the bulletin board. This does not seem to support Herring’s supposition that, for auditory learners at least, textual discussion should be a comfortable substitute for an oral discussion.

To the contrary, the lower number of pages accessed via WebCT that auditory learners logged would seem to support claim that compared to face-to-face interaction, text-only computer-mediated communications are devoid of the environment-rich information sources (such as body language and delivery style) that auditory learners value [27].

This study supports the claim of Riding and Mathias [17] that a student’s cognitive style does affect the way in which individuals find it easiest to learn. Therefore, an individual’s preferred way of acquiring information may be a contributing reason for what was observed in this study regarding auditory learners who, as Jacobson [12] suggested, may not be well served by either the text-based or the graphic interface of online learning. Jacobson opined that when learners are trying to cope with a large amount of new information in a short period of time, material should be presented in a format that allows the learner to process information most effectively.

Bandler and Grinder [28] indicated that there are two approaches to teaching: demanding that students adapt their mode of learning to conform with the teacher’s view of learning or alternatively that the instructor adapt teaching to fit the student’s mode of learning, thus packaging learning so that it is easier for students to learn it. For auditory learners, one possible solution to Herring’s [15] text-based discussion might be found in the recent development of audio in Voice over Internet Protocol programs such as Skype® or other Web 2.0 applications. Another possibility could lie in AT&T’s Naturally Speaking ® text to speech. The inclusion of audio into online learning would allow users to hear ideas being expressed as opposed to only reading the ideas of others and typing their own ideas. This suggestion needs to be investigated. However, the potential importance of the fourth correlation for auditory learners must not be overlooked: that there was a negative correlation between auditory learners and their comfort levels with accessing WebCT.

Some have suggested that it may not be that Generation Y prefers online learning, but rather just what they have come to expect [29]. These authors have argued that the Generation Y construct does not explain why there still remains a significant portion of students who do not want online courses. In analyzing the data collected for this study, one finding suggested that auditory learners may have a significantly lower interest in computers, as measured by their number of years experience with computers vis-à-vis students other perceptual modality preferences. In considering those students
who had strong auditory preferences (A = 6 or more), auditory learners had significantly fewer years of experience with computers (9.4 years) as compared to visual (14.1 years), readers (15.3 years) and kinesthetic learners (13.3 years). Is it possible that there is correlation between those who do not want online learning and those with auditory perceptual modality preferences? This possibility merits further research.

7 CONCLUSION

Technology has arguably found a niche in academe and the developments of web-based instruction holds significant promise for both educators and learners. The promise of these tools as an alternative delivery medium rests in its flexibility and multi-sensory integration of text, images, graphics, audio, and video. Web-based instruction, however, will only be effective when the medium is utilized in a pedagogically responsible manner.

All students in a class have the opportunity to see and experience the same course, though what they perceive and acquire differs due to selective learning filters. This study supports the claim that perceptual modality is indeed one of those learning filters that relate to acquiring information for the purpose of academic learning. The findings also seem to support the comments of Fleming [13], Jacobson [12], and Sankley [14] regarding the paradigm shift as to who is advantaged/disadvantaged by online learning versus traditional classroom teaching; that it is the Visual and Reading learners who are advantaged by text-based online learning while the auditory students who are disadvantaged by this same aspect of text-based online learning. Only when research enables us to understand how to design and integrate the multi-sensory components of our courses will online learning reach its full potential with no student disadvantaged by the medium being utilized.

References


