Not Another Inventory, Rather a Catalyst for Reflection

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In this article the authors focus on the use of a modal preferences questionnaire as a catalyst to empower students to reflect on their own sensory preferences and modify their study methods accordingly. The authors discuss the development and use of the questionnaire, strategies for students to use in modifying their learning behavior, responses of students and faculty to the technique, and directions for further investigation of modal preferences.

Over the last four decades the literature from both psychology and education has supported the proposition that learners of all ages have different yet consistent ways of responding in learning situations. These behaviors or predispositions to behave in a particular fashion have been termed learning styles (Claxton & Ralston, 1978; Grasha, 1990; Price, 1983) or cognitive styles (Goldstein & Blackman, 1978; Knox, 1977; Witkin & Goodenough, 1982). Research has spawned a wide range of inventories with which to assess the various style dimensions that have been identified (e.g., Canfield & Lafferty, 1974; Dunn, Dunn, & Price, 1987; Honey & Mumford, 1982; Kolb, 1984). Smith (1982) reviews fifteen such instruments for identifying learning styles. These measurement tools tend to focus on a collection of style dimensions to provide a profile of a learner's style.

'Me implications for teachers of the stylistic variation present in groups of learners has been discussed extensively in the literature (Cronbach & Snow, 1977; Hiemstra & Sisco, 1990; Kirby, 1979; Kogan, 1971; Martens, 1975; Messick, 1970; Schmeck, 1988; Tennant, 1988). Much has been writtenonthedesimbilityofmatchingteachingmethodstostudents'leaming styles (Conti, 1985; Cronbach & Snow; 1977; Faurier, 1984). If we assume that the matching of presentational style and learner styles is a desirable objective, teachers face an incredibly demanding task. 'Me range of style dimensions and therefore the combinations that might occur in one particular student group arc likely to be so extensive that teachers arc unable to extend their repertoire of teaching methods to encompass all of them (Mills, 1989).

Our collective observational experiences as teacher trainers and as an inspector of secondary schools in over 8000 classrooms during the last nine years have reinforced our belief that it is simply not realistic to expect teachers to provide programs that accommodate the learning style diversity present in their classes, even if they can establish the nature and extent of that diversity. We have come to the conclusion that the most realistic approach to the accommodation of learning styles in teaching programs should involve empowering students through knowledge of their own learning styles to adjust their learning behavior to the learning programs they encounter. This suggestion is not to say that we believe teachers should not consider the learning styles when developing and delivering instructional program. Rather, we believe in assisting students to know themselves and to operate in a metacognitive fashion to make adjustments in their learning behaviors (Biggs, 1987; Flavell, 1976).

Students arc in no better position than their teachers to understand and assess the wide range of dimensions that collectively form an individual's learning style. The literature is too extensive and provides limited assistance in determining which particular dimensions need to be addressed to gain a complete or at least comprehensive understanding of the nature of learning style. We therefore looked for a dimension of learning style that had some degree of pre-eminence over other dimensions.

By questioning students, we found that many students attributed their learning difficulties to the form in which course material was presented. Some students found they had difficulties learning in situations where the course material was only presented orally, while others reported similar difficulties when the material was primarily in written form. Still other

students experienced difficulty with ideas that were presented in graphics or without any associated concrete experiences. These insights prompted us to focus on sensory modality as a learning style dimension that had some pre-eminence over others. 'Me notion that tile way information is initially taken in by a learner influences what subsequently occurs has intuitive appeal.

We found support for this notion in literature on neuro-linguistic programming (NLP) (Bandier, 1976,.1979; McLeod, 1990; Stirling, 1987) that discussed the different perceptual modalities (aural, visual, and kinesthetic). The following questions were suggested from our exploration of this field of study, split-brain research (Gazzaniga, 1973; Sperry, 1973; Springer & Deutsch, 1985) and left brain/right brain modalities (Buzan, 199 1; Edwards, 1979):

- How can students be encouraged to reflect on the nature, extent and implications of their sensory modalities?
- As a consequence of exploring their sensory modality preference, will students modify their existing learning strategies in ways that assist their learning?

Our experience with the administration of learning style inventories did not encourage us to believe that the use of an inventory was going to be the most effective way of encouraging students to reflect upon their sensory modality preferences. We knew that students often found inventories tedious to complete and at times difficult to respond to because of their generality. Many inventories also lacked supportive strategies to assist students after they had been diagnosed. Students usually fell into two categories: those who enjoyed ascribing labels to their behavior and those who were suspicious of any measure that claimed to be able to establish that they behaved in predictable ways.

Our attention therefore turned away from inventories. We sought, instead, a simple technique that would promote reflection on sensory modality and would be characterized by its brevity, simplicity, and ability to encourage students to describe their behavior in a manner they could identify with and accept. We believed that if students could be intimately involved in the process that produced a description of their own sensory modality preferences, they might be more likely to use it in subsequent learning.

Developing a Technique

The Catalyst

The first task was to design a technique that would focus students' attention on ways they address information. Rather than a simple dagnostic tool, we wanted something that would serve as a catalyst for discussion and debate and encourage students to collaborate in the process. We believed the technique had to be something that drew on common experiences and did not introduce abstract notions. A simple questionnaire was therefore devised with the questions drawn from observations students had shared, personal observations of our own modal preferences, and preferences reported by friends (Appendix A). Some of the questions were prompted by discussions of how some people can navigate better than others. Other questions came from reflecting on the ways people chose to remember or ignore different sensory cues such as shopping lists or verbal instructions. Because we were seeking a quick and easy catalyst for discussion rather than an elaborate diagnostic tool, we decided that 13 questions would be adequate. In addition, we established that because the instrument would be used primarily to stimulate reflection and discussion, testing for construct validity and reliability was unnecessary and inappropriate.

Although we started with Stirling's (1987) three categories of visual, aural, and kinesthetic, we found that the categories appeared to be insufficient to account for the more detailed differences we noted among students. Even though our eyes are used to taking in all visual information, the information itself differs. 'Me first preference includes diagrammatic material often used by teachers to symbolize information (e.g., graphs, charts, flow charts, models, and all the symbolic arrows, circles, hierarchies and other devices used by teachers to represent what could have been printed information). Second, there is information that is largely composed of printed words from which some students appear to get a greater or lesser degree of understanding. Although both use the visual sense, for the purposes of the questionnaire, this visual preference was divided into two perceptual modes:

1. Visual (V) preference for graphical and symbolic ways of representing information.

2. Read/Write (R) preferences for information printed as words.

The third perceptual mode, aural (A), describes a preference for "heard" information. Students who prefer aural forms of information dissemination report that they learn best from lectures, tutorials, and discussion with other students and faculty.

The fourth perceptual mode, kinesthetic (K), provides some difficulties because it is multi-modal and because of the different ways in which the word is used. For the questionnaire it was defined as the perceptual preference related to the use of experience and practice (simulated or real). In that sense it is not a single mode because experience and practice may be expressed or '"taken in" using all perceptual modes-sight, touch, taste, smell and hearing. However, a kinesthetic

teaching experience is defined as one in which all or any of these perceptual modes are used to connect the Student to reality, either through experience, example, practice, or simulation. To offer these experiences, the teachers may be presenting information visually (V), aurally (A), or in a read/write fashion (R), but the experience is kinesthetic because of the integrative and real nature of the information. A teacher who chooses to provide "guns and butter" examples of the economic concept of supply and demand-regardless of whether visual, aural, or read/write modes are used is presenting information in a kinesthetic fashion. Such "guns and butter" examples could not be used as a basis for questions in the questionnaire, however, as the intention was to design a questionnaire that was not subject or discipline specific. Situations from everyday life were therefore chosen for 12 of the 13 questions.

In the final questionnaire, the 13 questions are presented in multiple-choice format. To be included from our original list, a question had to allow for the expression of three or four modal preferences (V, A, R, K). These modal preferences are offered as alternative actions in response to each question. Each question attempts to place readers in a situation within their experience and asks for a perception of their preferred action. For example:

Question Ten: You are not sure whether a word should be spelled 'dependent' or 'dependent'. Do you:

R) look it up in the dictionary.
V) see the word in your mind and choose the best way it looks.
A) sound it out in your mind.
K) write both versions down.

In the early stages of the development of the questionnaire, an attempt was made to include only those questions in which the context was one of "receiving information." Because this criterion became too limiting, the questionnaire now contains questions dealing with both presenting and processing information. Questions numbered 2, 4, 7, 8, 9 and 13 relate to a context in which information is being received. In questions 1, 3 and 5 respondents are put into a context of sending information, and in the remaining four questions (6, 1 0, I I and 12) the context is one of cognitive processing for decision making (see Appendix A). No attempt is made to separate these three contexts in the scoring system.

Although the questions were designed to be as culturally neutral as possible, question 8 uses some proprietary games (Pictionary, charades and Scrabble) with which students need to be familiar in order to complete the questionnaire. The alternatives within each question were designed to be balanced in intensity so that no one choice is seen as being determined by the situation.

To allow for the fact that we all use a variety of perceptual modes, we provided for the possibility of multiple answers for each question. All answers arc counted. Thus, some respondents may select a greater number of alternatives than others. It also means that there is less need to balance the modes within each question and within the questionnaire. In four questions there are three choices. The remainder have four choices. The sum of the alternative answers for each modal preference slightly favors the R mode (Visual, 12; Aural, 12; Read/Write, 13; Kinesthetic, 1 1).

A Pattern for Discussion

The modal preference profiles that emerge arc discussed with individual students. In all cases the profiles are promoted as insights and not as definitive diagnoses. Usually a general explanation of various common profiles is given, accompanied by anecdotal evidence of how knowledge gained from the questionnaire has helped other students. Students arc encouraged to challenge their personal profiles. In this way they are actively encouraged to establish the validity of their profiles by thinking about their general applicability. In some cases, students who have adopted strategies aligned to their preferences are asked to address groups of students.

The discussions with students focus on: 1) the way information is presented in classes; 2) ways in which students take notes; 3) ways in which students make notes from their reading; and 4) strategies for memorizing for assessment tasks.

Help Sheets

During the early trials, students who produced profiles that were dominated by one sort of response (ie., V, A, R, or K) were questioned in depth about the way they preferred information to be presented by faculty. 'They were also asked to provide examples of their study notes. From the data gathered, lists of note-taking and note-making strategies were compiled for each type of sensory modality preference. These lists form the basis for the handout "help" sheets (Appendix B) that give students ideas on how to use the preferences they have identified to improve their learning.

After the profiles that emerge from the questionnaire are discussed, these "help" sheets (Appendix B) are distributed to students. Students are then encouraged to consider the suggestions on the "help sheet" in relation to their learning practices. Possible modifications to study practices are briefly discussed and the students make an appointment to report back on the effects of any changes they subsequently make.

Using the Technique

The technique has been used in a number of different ways. First, it has been used in one-to-one student counselling for those who seek strategies for improving their learning. Second, it has been used with groups of faculty. The third and most common use has been with classes of students. In each case the process has begun by having participants complete the questionnaire.

In all cases participants are advised that they may record more than one option for any question. If all of the options are appropriate, they are asked to indicate what their first preference might be. For situations that lie outside their experience, they are requested to leave the answer blank. We have observed that most students can complete the questionnaire in four to six minutes, and verbal reports indicate that they can easily relate to the situations in the questions.

On completing the questionnaire, respondents are asked simply to sum the occurrences of their preferences for each mode. Ibis procedure results in four scores, one for each modal preference. Because students can select more than one option for each question and because they can omit questions, the sum of the four preference scores on the questionnaire will vary among individuals. The scores are then perused to determine a modal preference based on a simple numerical dominance of one mode over others. For example, a student scoring 2 visual options (V), 4 aural options (A), 8 read/write (R) options and 2 kinesthetic options (K) would be counted as having an R preference. When there is a tie between two or more modal preferences, the result is considered a double or triple tied preference (e.g., VA or ARK).

It has been the close match between the anecdotal evidence and the questionnaire and help sheet data that has led to our confidence in the ability of the questionnaire to provide valid insights into the ways students deal with information. In addition, students' responses have encouraged us to believe that the technique as a whole is an effective way of promoting active reflection by students on their learning activities. Students, convinced that the insights that they have gained are valid, have been quick to revise their learning behavior.

The use of the questionnaire has generated a wide range of response patterns that have been subsequently endorsed in the discussions with students. The following comments are from students who have adopted strategies to match the strengths reflected in their modality preferences. Their modality preferences as indicated by the questionnaire are shown in parentheses.

I rearranged my study notes for the four subjects in four different colors. That way *I can easily filter out the stuff I need when I am doing an exam for Economics because it is all in green (visual preference)*

Yesterday I bought my first Thesaurus. I have a dictionary for each of my science subjects - ecology, biology etc. I think words are wonderful I *build a glossary for my subjects too. (read/write preference)*

When I am in an exam and I am not sure of an answer I can pause and 'hear' Andrew (lecturer in low) talking about a topic. I just listen in until he 'tells' me the answer. (aural preference)

I have rearranged my notes so that the articles come first. It is so much easier to remember the stories -better than having the heavy principles stuff first. I put the principles, rules and formulae last. (kinesthetic preference)

I end up with real scrappy notes in the lectures, 'coz I get hooked into listening to the interesting stuff in the lecture. When I see what others have written- I panic. Since I did the questionnaire I leave space to fill in what I *miss through listening. (aural preference)*

Follow-up interviews with students have provided clear evidence that students are using the insights gained from their questionnaire results and subsequent discussion to reflect upon and modify their note-taking and notemaking practices. The following comments were made by students who monitored the effects of changing their study strategies to be consistent with their modality strengths.

I got my first A grade by using the things on the sheet (Appendix B). My notes now are all done as a read-writer.

It is excellent. I have an aural flat mate and we get together and talk about our learning at study time. We both seem to learn better from talking things through.

Since I attended the study skills session I have used Walkman (audio cassette player) for my own study summaries. Before the big tests I walk around the campus hearing myself It "works.

AM my notes now are done as diagrams. The words are still important but I try to think of a picture which comes from the words. It "worked last semester. There seemed to be less to learn.

I used to write things out several times and I tried mnemonics but I didn't do very well. I need to relate things to the real world If I can get a real-life example it helps my learning.

I don't use the set text. I found this other book which has a visual approach. I use different highlighters in it to show the bits to remember; similarities, contrasts, definitions and things.

Faculty, too, have found that the questionnaire provides a simple effective framework for reflecting on how they present information. faculty interest in using the technique is particularly exciting, because w believe that to assist one student with information about modal preferences is not as effective as increasing the sensitivity of one professor to the potential for modal diversity in a class. Previously the exhortations to present course content using the range of sensory modes had little impact. Since administering the questionnaire to faculty and sharing with them the results gathered from students, there is an increased awareness of, and interest in, varying teaching approaches to accommodate modal diversity. What was once unconscious strategy of the effective teacher has become a deliberate strategy. One science lecturer noted:

I realize I have been requesting R & W assessment and examples for my students. Now I need to provide more variation in both my lectures and assessment.

One professor is now searching for kinesthetic and visual examples his economic theory content that previously tended to be taught only in read/write mode. Similarly a biology professor is skilfully adding various diagrammatic examples of the systems to the typical kinesthetic experiences that are studied in the laboratories. Professors are reporting positive feedback from students when they attempt to make their teaching more multi-modal.

Discussion

Two general observations have emerged from the data generated by the questionnaire and the associated interviews:

I . The questionnaire does provide a basis for assisting students to reflect upon their modal preferences.

2. The individual response profiles generated by the questionnaire a supported by later discussion.

Each of these observations encourages us to believe the technique is useful for focusing students' attention on the sensory components of learning. The strength of the questionnaire appears to lie in its ability to act as a catalyst and framework for reflection and discussion of learning practices, including note-taking, note-making, and test and examination study. Students find the technique provides a framework that is consistent with their rational, intuitive notions about how they address information in learning situations. They therefore have no difficulty accepting the notion that adjustments to the way they take and make notes should be in accordance with their modality preferences and could benefit their learning effectiveness. The questionnaire and associated discussion appear to be encouraging metacognitive activity.

The next developments could take several directions. The possibilities that have been suggested include:

- a longitudinal study of the effects of students' identifying their modal preferences and adopting new strategies. There is a growing body of anecdotal information, but it would be helpful to have a more focused study of the detailed effects on some students' modifications of their learning-strategy.
- a study of the effects of multi-modal presentation of course content. Some faculty are extending their course content and teaching methods to cope with the different modal preferences. The impact of modal preferences on instructional design would be a worthwhile further study.
- a demographic study-including sex, age, race, and socioeconomic parameters of the results from use of the handout sheet.
- a study of students with strong uni-modal preferences as contrasted with those who have multi-modal preferences. 'Mere appears to be more multi-modal preferences with more mature students but that is a judgment based on anecdotal information rather than quantitative or qualitative analyses.
- an alignment of this questionnaire with an inventory of cognitive processing oral personality traits. There is a rich background of research and a wealth of database information on some of the widely-used personality and cognitive-processing inventories. The modal perception questionnaire could be conjointly used with an inventory to assess any linkages between perceptual preferences, cognitive strategies and personality traits.
- a study examining differences in the modal preferences of students and faculty. There is clearly a great deal of variability in the way both students and faculty address information. So far we have noticed general trends that do appear to be significant. For example, students appear to be less likely to show a strong preference for the read/write mode than faculty. In contrast, faculty are more likely to prefer a read/write mode than any of the other modes. Students with no particularly strong preference tend to be older students. All of these trends warrant further investigation.

- a link between the questionnaire and a fuller but validated diagnostic instrument.

Conclusion

Faculty developers are in search of strategies that encourage teachers to use a variety of modes in their presentations. Extending repertoires has become a touchstone for improved quality in teaching. The use of the modal preferences questionnaire at our university has empowered students to reflect upon their sensory preferences and to modify their study methods accordingly. Furthermore, the questionnaire appears to have increased the level of discussion about learning throughout the institution. The positive support from a growing number of students has filtered back to the faculty and is encouraging them to make changes. Although it is not yet possible to document the effect of these changes in terms of learning, at this stage the questionnaire is identifying differences, provoking reflection on learning and teaching practices and receiving favorable comments from both students and staff. Further research and development will be necessary to capitalize on these benefits in terms of improvements in teaching and learning outcomes.

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