Learning Styles and Perceptions of Self

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Kolb’s Learning Styles Inventory is one of the most commonly used instruments to identify a learner’s style. This paper attempts to find out whether our own perception of our learning style matches other people’s perception of our learning style. We have used a 360-degree technique to measure an individual’s learning style as perceived by others. A Mean Learning Style and a Learning Style Vector are defined to represent a collective perception of an individual learning style. The results show consistent differences between our own and others’ perception of our learning styles. These differences are analysed and validated using a placebo method and found to be accurate descriptions of perception. The results suggest that a learning styles inventory test, used in this manner, could be a measure of public and private perceptions of self.

Key words: vector, perception, abstract conceptualisation, concrete experience, placebo.

Introduction

Learners learn in different ways. Several studies discuss learning styles and find that learning depends upon many personal factors and everyone has a distinct learning style (S. Montgomery, 1996; Mumford & Honey, 1996).

In the present study, results reveal that there is a discrepancy in our perception of our learning style and in others’ perception of our learning style.

The term "Learning Style" has been defined as “the composite of characteristic cognitive, affective, and physiological factors that serve as relatively stable indicators of how a learner perceives, interacts with, and responds to the learning environment” (Keefe, 1979). According to Cronbach & Snow (1977), learning styles could be used to predict what kind of instructional strategies or methods would be most effective for a given individual and learning task.

One way to optimise learning could be to find out a person’s characteristic style of learning, if any, and then match the learning environment to the person.

The Learning Style Inventory (LSI) is a test that assesses the characteristic learning style of a person.

Presently, there are different learning styles models, which are based on different psychological theories. Models based on Personality include Witkin’s (1954) and Myers-Briggs Type Indicator (Myers,1978). Schmeck’s (1983) and Kolb’s (1984) models are examples of the Information Processing approach. Reichmann and Grasha (1974) models are based on Social Interaction. And finally, Keefe (1989) and Dun & Dun (1978) models are based on the multidimensional factors within Human Information Processing. All these models stress the importance of identifying and addressing individual differences in the learning process.

The most commonly used inventory is the one proposed by Kolb (1984) which is based on Piaget’s model on Learning & Cognitive Development and Jung’s personality type, i.e. Myers-Briggs Type Indicator (MBTI).
We administered Kolb’s Inventory to a large number of persons in India and were faced with difficulties such as:

1. The rationale for the statistical treatment used to derive the results.
2. The rationale behind choosing buffer items.
3. Lack of clarity in the meaning of the adjectives used in the inventory.

In order to address the Indian context, the inventory had to be adapted to suit the Indian population. We adapted Kolb’s Learning Styles (LSI) Inventory to the Indian context (Dangwal and Mitra, 1997). As in the case of Kolb’s original inventory, the present inventory involves four principal stages: Concrete Experience (CE): learners are able to involve themselves fully, openly, and without bias in new experiences; Reflective Observation (RO): learners are able to reflect on and observe their experiences from many perspectives; Abstract Conceptualization (AC): learners are able to create concepts that integrate their observations into logically sound theories; Active Experimentation (AE): learners are able to use these theories to make decisions and solve problems. The CE/AC and AE/RO dimensions are polar opposites as far as learning styles are concerned and it identifies four types of learners depending upon their position on these two dimensions. The four types of learner are: Analytical, Imaginative, Precision and Dynamic.

Further, learning activities can be divided into two categories: Perception and Processing. Perception is measured by the CE/AC continuum. For example, some people best perceive information using concrete experiences (like feeling, touching, seeing and hearing) while others best perceive information abstractly (using mental or visual conceptualisation). Once information is perceived it must be processed which is measured by the AE/RO continuum. For example, some people process information best by active experimentation (doing something with the information), while others process best by reflective observation (thinking about it).

Use of a 360 degree technique

Is the Learning Styles test telling us what our learning style is or is it telling us what we would like our learning style to be? We felt that if the learning style identified by the test for an individual could be corroborated with the perceptions of that individual’s learning style by others who know him or her, then there would be reason to believe that the test is measuring what it is supposed to measure. We could find no test that allows us to measure how others’ perceive our learning style. We, therefore, adopted a 360-degree technique. In this technique, we identify a person X and ask other people who know X to take the learning styles test but mark each item as they think X would have marked them. In the present experiment, we have compared self perception of learning style with others’ perception of an individual’s learning style using the learning styles inventory (Dangwal and Mitra, 1997).

Purpose of this study

We felt that the following questions are important if the results of any learning styles test are to be useful. These questions may be relevant for any test but in the present paper we have taken the context of the LSI.

1) Do we identify our learning style as it is or as we would like it to be?

This is important in order to determine what style would best help a learner achieve a learning objective. If a LSI test merely identifies a learners desired style as opposed to how he or she actually learns, the test would have limited usefulness for designing instruction for that learner.

2) How do other people perceive our learning style?

This is important if teachers, or teaching systems, are to use LSI test results to modify their style of instruction. If others perceive our learning styles differently from how we perceive it, the difference would need to be understood.
3) Does the LSI correctly reflect our perception of our own as well as of others learning styles?

It is necessary to know whether the description of a learning style for a particular person as given by a LSI test, is consistent with that person’s own as well as other’s experiential assessment of his/her learning methods. If the experiential conclusion differs from the test results, the differences would need to be understood.

**Methodology**

We decided to use a “360 degree” method to answer some of the questions above. A person (say P) would take the LSI test as usual. Others taking the LSI test would follow this, but they would mark the items in the test as they think P would have marked them. The results of the latter tests would constitute other’s perception of P’s learning style. The selection of the group is very crucial. The target group must know the person P “well enough” to take the test as P.

We report the study in two parts:

*Part I* - Experiment and the Results

*Part II* - Verification of the Results.

**Operational Definitions:**

Results of our Learning Styles test consist of points placed in one of four quadrants. Each point represents one test result (Fig 1). Group perception of an individual’s learning style was evaluated by defining a mean learning style (MLS) and a learning style vector (LSV) pointing to this mean. This was done as follows:

a) The MLS was calculated as the centre of gravity of points for each quadrant.

b) The LSV was constructed by joining the MLS to the origin.

The magnitude of the LSV is equal to its length. The direction of the LSV is equal to the angle between the LSV and the x-axis (i.e. the AE-RO line) measured in the counter clockwise direction.

The magnitude of the LSV determines the extent to which the person conforms to a particular style of learning as determined by a quadrant. For example, a shorter magnitude indicates that the degree to which he conforms is less as opposed to a person whose magnitude is longer. On the other hand, the direction of the LSV determines the “inclination” of the individual with respect to the perception (CE-AC) or processing (AE-RO) lines. Figures 1 and 2 below show the LSV for two hypothetical individuals, both of whom are in the Imaginative quadrant of the LSI diagram.

![Figure 1. For person A](image-url)
In Figure 1 the magnitude of the LSV is 7.5 whereas in Figure 2 it is 3.0. In other words, person A is more conforming in his learning style as compared to person B. Similarly, the angle in Figure 1 is 35 degrees whereas in Figure 2 the angle is 75 degrees. This means that person A is more inclined towards “Reflective Observation” (RO) while person B is more inclined towards “Concrete Experience” (CE).

**Part I: Experiments and Results**

*Description of the Experiment*

Six subjects code-named X, Y, Z, A, B and C were identified and were asked to respond to the LSI questionnaire. The same questionnaire was then given to six groups of people. Each group knew one or more of the subjects well. Each group was asked to respond to the questionnaire not as themselves but as one of the subjects they knew well. The group size evaluating each subject varied from 9 to 58 people.

*Results*

1) Subject X

150 questionnaires were distributed to various people who had interacted with person X in various capacities. They were asked to respond to the questionnaire as person X. The same questionnaire was also given to X for self-evaluation. 58 people responded to the questionnaire including X. The results are as follows:

**Mean learning style** of the total population on AC/CE dimension is -1.06 and AE/RO dimension is 3.0. X falls in the Dynamic quadrant. In other words, others perceive X to be a “Dynamic learner”. However, X perceives himself to be an “Imaginative learner”.

<table>
<thead>
<tr>
<th>Table 1. Mean &amp; Standard deviation for the four quadrants</th>
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<tbody>
<tr>
<td>Mean &amp; Standard deviation</td>
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<tr>
<td>---------------------------</td>
</tr>
<tr>
<td>AC-CE continuum</td>
</tr>
<tr>
<td>SD</td>
</tr>
<tr>
<td>AE-RO continuum</td>
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<tr>
<td>SD</td>
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</tbody>
</table>

From Table 1 it is clear that the largest number of people have placed X in the Dynamic quadrant, followed by the Imaginative quadrant, then the Analytical and lastly the Precision quadrant.
Learning Style Vector: Figure 3 gives a graphical representation of the vectors in each quadrant. People who find X to be a Dynamic learner feel that X is inclined towards “Active Experimentation”. The angle of the line is 35 degrees (to the AE side of the axis) with a magnitude of 12.35. On the other hand, people who find X to be an Imaginative learner, feel that he is more inclined towards “Reflective Observation”. The angle of the line is 37 degrees (to the RO side of the axis) with a magnitude of 7.6. People who find X to be a Precision learner feel that he is inclined towards “Active Experimentation”. The angle of line is 40 degrees (to the AE side of the axis) with a magnitude of 12.05. Lastly, people who perceive X to be an Analytical learner feel that he is more inclined towards “Reflective Observation”. The angle of line is 25 degrees (to the RO side of the axis) with a magnitude of 8.31. The predominant style of conformance of X is Dynamic.

As the next step, we defined two subgroups of the original group that evaluated X. The first subgroup consisted of close associates of X, who had worked with him for 10 years or more. The second subgroup consisted of people who reported to X. This was done primarily to see whether there would be any difference in how the two subgroups perceive the learning style of X. The sample size selected in this case was purposefully smaller in number.

Figure 3. Subject X

Close associates of X: 9 people were identified in this subgroup. Mean learning style of the total population on AC/CE dimension is -1.33 and on the AE/RO dimension is 8.66. In other words, this group perceives X to be a Dynamic Learner.

People reporting to X: 10 people were identified in this subgroup. Mean learning style of the total population on AC/CE dimension is 0 and on the AE/RO dimension is 1.5. In other words, this group perceives X to be an Imaginative Learner.

Thus, people working under X perceive him as an Imaginative learner. Their perception matches with his own perception, i.e., with X’s perception of himself. Whereas, people working close to X perceive him as a Dynamic learner, which does not match with his own perception. This is somewhat surprising as it may have been expected that people close to X should have perceived X the same way as X perceives himself.

2) Subject Y:

Mean learning style of the total population on AC/CE dimension is 6.00 and AE/RO dimension is -6.36. Average population perceives Y to be an Analytical learner. Y also perceives himself as an Analytical learner. If, however, we ignore Y’s responses, then the shift moves from the analytical quadrant to the Imaginative quadrant. In other words, Y perceives himself as an Analytical learner while the others perceive him as an Imaginative learner.

Table 2 shows that equal number of people have placed Y in the Imaginative quadrant as in the Analytical quadrant.
Table 2. Mean & Standard deviation for the two quadrants

<table>
<thead>
<tr>
<th></th>
<th>Imaginative (no. of people = 5)</th>
<th>Analytical (no. of people = 5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC-CE continuum</td>
<td>-2</td>
<td>12.8</td>
</tr>
<tr>
<td>SD</td>
<td>2.82</td>
<td>4.60</td>
</tr>
<tr>
<td>AE-RO continuum</td>
<td>-8</td>
<td>-10.4</td>
</tr>
<tr>
<td>SD</td>
<td>7.11</td>
<td>7.66</td>
</tr>
</tbody>
</table>

Learning Style Vector: Figure 4 gives a graphical representation of the vector. People who perceive Y as an Imaginative learner feel that he is more of a “Reflective observer”. The angle of the line is 35 degrees (to the RO side of the axis) with a magnitude of 8.2. Similarly, people who find Y to be an Analytical learner feel that he is also inclined towards “Reflective observation”. The angle of the line is 40 degrees (to the RO side of the axis) with a magnitude of 16.5.

The two groups agree that Y processes information by “Reflective Observation”. However, the largest MLS is in the Analytical quadrant and matches Y’s own perception of self.

![Figure 4. Subject Y](image)

3) Subject Z:

Mean learning style of the total population on AC/CE dimension is 11.00 and AE/RO dimension is 7.4. Average population perceives Z to be a Precision learner. Whereas, Z perceives himself to be an Analytical learner.

From Table 3 it is clear that there are two distinct groups. One group who perceives Z to be a Precision learner and the other group perceives Z to be an Analytical learner.

Table 3. Mean & Standard deviation for the two quadrants

<table>
<thead>
<tr>
<th></th>
<th>Precision (no. of people = 7)</th>
<th>Analytical (no. of people = 3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC-CE continuum</td>
<td>14.33</td>
<td>7.33</td>
</tr>
<tr>
<td>SD</td>
<td>6.86</td>
<td>5.77</td>
</tr>
<tr>
<td>AE-RO continuum</td>
<td>11.0</td>
<td>0</td>
</tr>
<tr>
<td>SD</td>
<td>2.44</td>
<td>0</td>
</tr>
</tbody>
</table>

Learning Style Vector: Figure 5 gives a graphical representation of the vector. People who find Z to a Precision learner feel that he is more oriented towards “Abstract Conceptualisation”. The angle of line is 52 degrees (to the AE side of the axis) with a magnitude of 18. People who find Z to be an Analytical learner also feel that he is inclined towards “Abstract Conceptualization”. The angle of line is 70 degrees (to the RO side of the axis) with a magnitude of 7.33.
Both the groups agree that Z perceives information through “Abstract Conceptualization”. However, the higher MLS is in the precision quadrant and is different from Z’s self-perception.

![Figure 5. Subject Z](image)

4) **SUBJECT A:**

**Mean learning style** of the total population on AC/CE dimension is -7.00 and AE/RO dimension is 4.54. Average population perceives A to be a Dynamic learner. However, A perceives herself to be an Imaginative learner.

Table 4 suggests that there are two distinct groups. One group perceives A as a Dynamic learner while the other group perceives A as an Imaginative learner.

<table>
<thead>
<tr>
<th>Mean &amp; Standard deviation for the two quadrants</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mean &amp; SD</strong></td>
</tr>
<tr>
<td>----------------</td>
</tr>
<tr>
<td>AC-CE continuum</td>
</tr>
<tr>
<td>SD</td>
</tr>
<tr>
<td>AE-RO continuum</td>
</tr>
<tr>
<td>SD</td>
</tr>
</tbody>
</table>

**Learning Style Vector:** Figure 6 gives a graphical representation of the vector. The MLS falls in the Dynamic quadrant and is different from A’s perception of self. Both the groups agree on a high value for Concrete Experience but disagree on the AE-RO axis.

The predominant style of conformance is Dynamic.

5) **SUBJECT B:**

**Mean learning style** of the total population on AC/CE dimension is -2.36 and AE/RO dimension is -11.90. Average population perceives B to be an Imaginative learner. Though, B perceives herself to be an Analytical learner.

It is clear from Table 5 that there are two distinct groups. One group perceives B to be an Analytical learner and the other group perceives B to be an Imaginative learner.
Learning styles and perceptions of self

Figure 6. Subject A

Learning Style Vector: Figure 7 gives a graphical representation of the vector. Both the groups feel that B processes information through “Reflective observation”. They disagree on the CE-AC axis. The MLS falls in the Imaginative quadrant which is different from B’s perception of self.

Table 5. Mean & Standard deviation for the two quadrants

<table>
<thead>
<tr>
<th>Mean &amp; SD</th>
<th>Imaginative (no. of people = 9)</th>
<th>Analytical (no. of people = 2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC-CE continuum</td>
<td>-4</td>
<td>5</td>
</tr>
<tr>
<td>SD</td>
<td>6.48</td>
<td>1.41</td>
</tr>
<tr>
<td>AE-RO continuum</td>
<td>-9.66</td>
<td>-22</td>
</tr>
<tr>
<td>SD</td>
<td>5.83</td>
<td>2.82</td>
</tr>
</tbody>
</table>

6) SUBJECT C:

Mean learning style of the total population on AC/CE dimension is 4.61 and AE/RO dimension is 2.76. Average population perceives C to be an Analytical learner, though, C perceives himself to be an Imaginative learner. Table 6 suggests that there are two distinct groups. One group perceives C to be an Analytical learner and the other group perceives C to be an Imaginative learner.

Figure 7. Subject B
Table 6. Mean & Standard deviation for the two quadrants

<table>
<thead>
<tr>
<th>Mean &amp; SD</th>
<th>Analytical (no. of people = 7)</th>
<th>Imaginative (no. of people = 4)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>AC-CE continuum</td>
</tr>
<tr>
<td></td>
<td></td>
<td>12.66 -3.5</td>
</tr>
</tbody>
</table>

Learning Style Vector: Figure 8 gives a graphical representation of the vector. Both groups agree on the AE-RO axis but disagree on the CE-AC axis. The MLS falls in the Imaginative quadrant.

Part II: Verification of the Results

Description of the Experiment

After conducting the first experiment as described above, we decided to conduct another experiment to check the validity of the test itself. Here, we presented each person who had marked the test for another person, with a description of the results. That is, if a person, P, had evaluated another person, A, as dynamic, we would present the standard description of a dynamic learner to P and ask him/her to compare this description against their intuitive perception of A according to the four options shown below:

Option 1: The description matches perfectly.

Option 2: The description matches to a great extent.

Option 3: The description matches somewhat.

Option 4: The description does not match at all.

This feedback form was given to the people who had responded for others and/or themselves. Each person compared the results for four other persons.

The same exercise was repeated on another group. However, of the four test results and corresponding descriptions that were given, two descriptions were purposefully selected to be incorrect. That is, if a person had marked a test such that the result evaluated to, say, analytical, he was given the description of the, say, dynamic style and asked to match that with his perception of the person he had marked for.
Results
In the first case, everybody marked either option one or option two. That is, they agreed perfectly or to a
great extent with description of the person for whom they had responded.
In the second case, all respondents selected options one or two for the correct descriptions and options
three or four for the incorrect ones.
We find these results highly supportive of Kolb’s original descriptions (Kolb 1984b) of each learning style.
All respondents were effortlessly able to identify the incorrect descriptions.
In fact, one is tempted to state that the results seem to indicate that while people may have misconceptions
about what their own or other’s learning styles may be, they are consistently clear about what the style is
not!

Conclusions
The results give indicative answers to the questions posed earlier. For the cases studied:
1) There is, often, a difference between how we perceive our learning style and how others perceive our
learning style.
2) Perceptions of self by self, and of self by others, fall in adjacent quadrants and never in diagonally
opposite quadrants.
3) Responses are not scattered uniformly over the graph. On the contrary, there is a definite clustering of
responses. These clusters are formed in the quadrant that is indicated through self-perception and in an
adjacent quadrant.
4) The 360-degree technique used with a LSI test is found to be useful in determining how different groups
perceive a person. For example, for evaluating the perceptions of subordinates, friends or family.
5) The LSI descriptions correctly reflect our perceptions of our own, or others, learning styles.
6) The “real” learning style is neither based on self perception or other’s perception of self but is
somewhere in between.

Speculative Comments
In every case that we studied, self-perception was different from the perception of self by others. What
could this indicate?
a) Do we identify our learning style as it really is or as we would like it to be?
b) Do we have a perceived style, that is “what we really are” but we project another style that we want
others to perceive us as? Is this process deliberate on our part? Do we have a private image that is core
to us and a public image that we purposefully project in front of others? Maybe, the public self
becomes operational only when we interact with others. The reason for this projection could be varied,
for example, self-preservation, vulnerability, adaptation to the environment, etc.
Or
c) Is there a manifestation of two distinct personalities? Is this universal? If this is true, can a 360-degree
technique measure the extent of the difference between these two personalities?
References


