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“The Development of a Theory of Learning Performance”

By

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Abstract:

Prior research that examined the effectiveness of face-to-face versus various computer-assisted teaching methods has resulted in "no significant differences". However, this research was conducted without the benefit of a theoretical model that could be tested empirically with structural equation modeling techniques. The purpose of this paper is to develop such a model that will be operationalized with appropriate data as a second step.
**Introduction:**

Distance learning is not a new concept. Correspondence courses have long been a means of educating students at all grade levels that are geographically removed from institutions of learning. These types of courses have also been a low cost method of delivering adult education programs. In the 1960s television and teaching machines (Gagné, 1965) became the modern mode of delivering course materials. The 1970s introduced the VCR and low cost audiocassette components opening the door to audio and video type programs. The 1980s and 1990s launched inexpensive personal computers and enabled the development of teleconferencing technologies. We now have the Internet and a whole new set of resources available for use as teaching tools.

Each of these media has its own strengths and weaknesses. Television broadcasting and teleconferencing are both limited to being in the synchronous mode. All participants have to be present at the same time (although not in the same place) and the instructor controls the pace at which the material is presented. However research has shown that the synchronous mode of learning is less desirable. A positive relationship was found to exist at the college level between student control of the learning pace with motivation and performance (Fisher & Grant, 1983, Keller & Knopp, 1987).

Video-based, audio-based, and correspondence courses all have the benefit of being asynchronous in that participants can learn at different times and places from each other and the instructor. But these methods lack interaction between the student and the instructor or students with other students. Some correspondence courses have a limited, written or e-mail interaction between the instructor and the participant but because of the lack of timeliness of the postal service and the instructor’s responses, any beneficial
interaction effect is moderated. Some learning theories view learning as a social process that occurs more effectively through interaction in a cooperative context (Piaget, 1926). The need for interaction cannot be satisfied by such one-way teaching methods.

Instruction using Internet technologies is currently the only method of teaching that allows for instructor-student interaction, student-student interaction, and asynchronous processing allowing the student to control the pace of learning. In addition, Internet-based learning also has the advantage of being available anywhere there is a telephone plug. In today’s global economy, punctuated with business men and women with their laptops, effective learning need not require a classroom.

The cost of Internet-based learning is also very attractive. Teleconferencing requires a large investment in classrooms with computers built into the desks, large screen video displays, cameras in each classroom, audio pickup and broadcast, broadband transmission capability, routers, and modems. By comparison, Internet-based learning requires only a personal computer or laptop with a modem, a server, an Internet service provider, and a telephone plug. Virtually all business people today already have the equipment needed.

In this paper I will develop a theory of learning performance from a review of available literature. The purpose of this theory is to develop a model that can be used to empirically test learning effectiveness resulting from two different teaching methods; specifically, an Internet-based approach as compared to a face-to-face, traditional classroom format. Previous research in the field repeatedly results in “no significant differences” between face-to-face and various computer-assisted methods. However,
none of these studies were based on a causal path model that would explain the constructs and interactions occurring in the learning process.

In the next section of this paper I will present the theory and the foundations from which it was drawn. All of the constructs will be defined and ideas for operationalizing them will be discussed. Propositions reflecting the causal path relationships between the constructs will also be itemized. From a sociological paradigm perspective, the Theory of Learning Performance is an eclectic theory drawing upon social fascist, social behaviorist, and social definitionist theories. The final sections of this paper will relate each of these paradigms to the theory.

It is important to mention one point relative to generalizability. The Theory of learning Performance is developed specifically for the academic environment at the high school, college or university level. Although it is believed that many aspects of it are applicable to lower levels, it is not intended for those purposes. The basic theory is goal attainment oriented and relates goal attainment to academic attainment. As will be discussed later, previous research has shown these constructs to be related using high school age subjects. Goal setting and attainment at the sub-high school level may not result in the same relationships as it does at the high school and college level.

**Construction of the Theory of Learning Performance:**

Porter and Lawler (1968) developed the notion of Expectancy Theory as a means of understanding the relationships between motivation and performance behaviors. There are three concepts that are the building blocks for the theory; performance-outcome expectancy, valence, and effort-performance expectancy. Performance-outcome expectancy says that every behavior has associated with it, in an individual’s mind, an
expected outcome (rewards or punishments). The individual believes that if he/she behaves in a certain way then he/she will get certain things. Valence is the value, worth, attractiveness of an outcome to the individual. People put different values on a reward or punishment based on their own perceptions of relevance. Effort-performance expectancy represents the individual’s perception of how hard it will be to achieve a behavior and the probability of successful achievement of that behavior.

These concepts can be put together and reflect that motivation will be greatest when:

a) The individual believes that the behavior will lead to outcomes (performance-outcome expectancy).
b) The individual believes that these outcomes have positive value for him/her (valence)
c) The individual believes that he/she is able to perform at the desired level (effort-performance expectancy).

Figure 1 shows the basic motivation-behavior sequence described by Expectancy Theory along with a single moderator. Ability to achieve the behavior moderates the effort-to-performance relationship. An individual can be highly motivated and put out the effort but because of limitations in ability, he or she is not able to fully achieve the necessary level of performance. Similarly, a low level of effort could still result in acceptable performance when there are high levels of abilities.

Figure 1

Motivation-Behavior Sequence
Proposition 3: The greater the ability to learn, the greater the learning performance.

Proposition 4: The greater the learning performance, the greater the chances of attaining goals.

Proposition 5: The greater the perceived value of the goal, the greater the motivation.

In George Homan's (Turner, 1997) exchange propositions his success proposition, value proposition, and stimulus proposition closely parallel the Porter and Lawler concepts of performance-outcome expectancy, valence, and effort-performance expectancy. However, Homan's perspective generates additional propositions to be evaluated in the Theory of Learning Performance as follows:

Proposition 6: The more learning success a person has experienced in the past, the more effort they will apply to current learning.

Proposition 7: The more valuable a person perceives the goal to be, the greater the effort they will expend.

Operationalization of Constructs:

In order to test the Theory of Learning Performance empirically, I would initially make learning the dependent variable rather than goal attainment. Learning can be measured a lot more precisely. Volume of information learned can be measured with a before/after test. Retention can be measured with a before/after/after test. Perceptions of learning and changes in attitudes toward the value of the subject matter can be uncovered with scaled measures. The ability to apply information acquired can be determined experimentally.
There are also various measures of ability such as GRE or SAT score, grades earned in previous classroom environments, or even IQ tests. Motivation and effort can both be measured with scaled questionnaires.

**Accounting for the Learning Environment:**

Kurt Lewin (Whitaker, 1965) developed the idea that behavior is a function of a person in his/her environment. This concept was specifically restated to the learning environment by Hunt and Sullivan (1974) in their Social Learning Theory and codified as follows:

\[ B = f (P \& E) \]

The environmental issues impacting the educational system can be categorized either as within the immediate academic environment or in the broader societal environment. Academic environment influences include social norms within the peer groups. The societal environment includes cultural, community, and family influences. The positive or negative attitudes of the peers, family, community, and cultural group towards education and the educational system will have an influence on the student’s attitudes, motivations and other behaviors within the learning process.

Adding the cultural and societal subsystems to the learning performance theory also generates additional propositions.

**Proposition 8:** The more positive the peer groups’ attitudes towards learning, the more motivated the student.

**Proposition 9:** The more positive the family’s attitudes towards learning, the more motivated the student.

**Proposition 10:** The more positive the community’s attitudes towards learning, the more motivated the student.
Proposition 11: The more positive the cultural group’s attitudes towards learning, the more motivated the student.

Accounting for the Presentation of the Learning Material:

A construct is added to the Theory of Learning Performance for the presentation of the course material. Presentation is a combination of the attributes of the instructor, the methods used in presenting the material, and the subject matter itself. This construct is both a predictor of learning and of effort to learn. The synergies of the instructor can elicit more or less effort from the individual students or perhaps different teaching methods will influence the amount of effort the student puts forward. Leidner & Jarvenpaa (1993) found, while studying three different instructors and varying degrees of electronic classroom environments, that teacher style appeared to be an important factor. They also determined that a student preference (learning style) for one teaching method over another was an important moderating variable between the method and its effect. Matta and Kern (1991) found that there are student personality characteristics that effect learning success with different teaching methods. In particular, they found that introverted students performed better than did extroverted students when utilizing computer aided instruction techniques. In the following propositions the term “fit” refers to the alignment of the student’s needs, abilities, and learning styles to the instructor’s teaching style, abilities, experience, and leadership qualities:

Proposition 12: The more effective the perceived quality of the presentation of the material, the greater the amount of effort spent to learn.

Proposition 13: The more effective the perceived quality of the presentation of the material, the greater the amount of learning that will occur.

Proposition 14: The more effective the perceived quality of the presentation of the material, the greater the motivation to learn.
Proposition 15: The better the “fit” of the teaching method to the student, the greater the amount of effort spent to learn.

Proposition 16: The better the “fit” of the teaching method to the student, the greater the amount of learning that will occur.

Proposition 17: The better the “fit” of the teaching method to the student, the greater the motivation to learn.

Proposition 18: The better the “fit” of the teaching materials to the student, the greater the amount of effort spent to learn.

Proposition 19: The better the “fit” of the teaching materials to the student, the greater the amount of learning that will occur.

Proposition 20: The better the “fit” of the teaching materials to the student, the greater the motivation to learn.

Proposition 21: The better the “fit” of the teacher’s attributes to the student, the greater the amount of effort spent to learn.

Proposition 22: The better the “fit” of the teacher’s attributes to the student, the greater the amount of learning that will occur.

Proposition 23: The better the “fit” of the teacher’s attributes to the student, the greater the motivation to learn.

**Accounting for the Concept of Self:**

Peter Blau looked at differences in power in an exchange as leading to conflict. However, this potential for conflict can be overcome when power is converted into authority. The teacher/student relationship has an imbalance of power and if the student cannot accept this imbalance in the exchange, then they will be dissatisfied and effort will be diminished. The interactionist theorists would refer to this as “role”. The student must accept their role and the role of the instructor in order to deal with the imbalance of power in the relationship. The concept of role is the key mechanism of interaction according to both the Chicago and Iowa schools (Turner, 1997; 370, 371). A construct
will be added to the Theory of Learning Performance that I will designate as “concept of self”. This construct will be defined to include not only the ability to accept one’s role in the teacher/student exchange but also the student’s self efficacy. The perception of the person’s own abilities to accomplish their learning goals. A person expects himself or herself to perform more capably relative to another individual or other individuals. This concept is central to the notion of Expectation State as described by Joseph Berger and his associates (Turner, 1997; 452).

**Proposition 24:** The more the student can accept the power imbalance and their roles in the teacher/student exchange, the greater the amount of effort spent to learn.

**Proposition 25:** The greater the level of self-efficacy, the greater the amount of effort spent to learn.

By adding self-efficacy as a construct in the theory, the moderation impact of the learning ability construct previously defined will be affected. By including a person’s perception of their learning ability as antecedent to their actual learning ability, the amount of variance left to be explained by the actual ability would now just represent the difference between the perceived ability of the student as reflected in self efficacy and the actual ability as measured by grade point averages, SATs, or possibly by IQ testing. There is also a causal relationship between actual and perceived ability. A person with a greater amount of learning ability is more likely to have performed better in learning situations in the past and would therefore have a perception of greater ability.

**Proposition 26:** The greater the level of actual ability, the greater the level of perceived ability.

The pieces of the Theory of Learning Performance can now be combined as diagrammed in Figure 3 on the next page.
Figure 3 – Theory of Learning Performance
From the Social Behaviorists and Interactionist Viewpoints:

The Theory of Learning Performance I have proposed contains several elements taken from the social behaviorist viewpoint. Most significantly the underpinning to the basic theory came from Porter and Lawler's Expectancy Theory as was mentioned in the second section of this paper. Expectancy Theory was Porter and Lawler's means of explaining the relationships between motivation and performance behaviors. Clearly their theory was grounded in George Homans' exchange principles. Homans introduced a rationality proposition to exchange theorizing, which can be shown in the following formula:

\[ \text{Action} = \text{Value} \times \text{Probability} \]

He saw people as being rational and making decisions relative to performing actions based on the value of the results and the probability of success. These principles reflect that people are more likely to perform an activity the more valuable they perceive the reward of that activity to be. Also individuals are more likely to perform an activity the more successful they perceive the activity to be in getting that reward. These notions are all a part of Expectation Theory.

The role of the instructor also becomes more clearly defined under exchange theorizing. The "cost" to the student for attaining learning is initially their time, effort, and expense. According to Rational Choice Theory, cost also includes the deferred or forgone costs of lost alternatives. Time and effort are the more significant cost to the student and in exchange they expect to receive the time, effort, and abilities of the instructor along with proper learning materials and classroom attributes necessary to properly learn.
The role of the student is also a concern of the social behaviorist. Not only must the student satisfy themselves that the reward balances out the costs of the exchange, but they must also be comfortable in the role itself. They need the self-confidence in their own ability to successfully accomplish the learning objective as well as the ability to accept the lower position of student. The power differences between student and instructor can cause a perception of uneven interaction in the exchange. The student needs to become comfortable with this unevenness in order to achieve the learning objective.

Another area where behaviorist theorizing supports the Theory of Learning Performance is where Peter Blau and Otis Dudley (1967) developed the Process of Stratification theory that related the occupational role and educational attainment of the father to the child’s occupational and educational attainments. This research also showed a strong correlation between educational attainment and occupational attainment. These two constructs relate to the learning performance and goal attainment constructs in the Theory of Learning Performance. Blau and Dudley’s research was expanded into the Status Attainment Model (also known as the Wisconsin Model) (Jencks, Crouse, & Mueser 1983; Hauser, Tsai, & Sewell 1983; Campbell, 1983) as will be discussed in the next section of this paper.

**From the Functionalist Viewpoint:**

The Status Attainment Model (Sewell, Haller, & Portes; 1969) reflects many of the constructs used in the Theory of Learning Performance. This is shown in Figure 4 on the next page.
This functionalist model supports the following paths detailed in the Theory of Learning Performance:

- Learning performance-goal attainment (proposition 4)
- Ability-performance (proposition 3)

If "aspiration" as used in the Status Attainment Model can be substituted for "motivation" in the Theory of Learning Performance:

- External persons’ influence-motivation (propositions 8 through 11)
- Effort-goal attainment (proposition 2)

A Parsonian Note:

The Theory of Learning Performance can be looked upon from a functionalist perspective as a part of a system of education. In keeping with the typologies developed by Talcott Parsons, as an exemplar of functionalist thinking, there are definitely some goal seeking attributes of an educational system. However, I would not categorize this system in that quadrant of the Parsonian structure. Goals of the educational system can
be defined at the macrofunctionalist, mezofunctionalist, and the microfunctionalist level. An individual’s goals in participating in the learning process would be to qualify for a new or better job, or perhaps to master some physical skill. The ultimate goal is to achieve the successes in life that are a function of or a result of acquiring knowledge. The academic institution’s goals are to provide educational services in an economic fashion that results in the highest achievement ratings for the institution. The societal goals are to have a skilled workforce that can accomplish all the tasks defined by the division of labor. In addition the overall society would have a goal of developing people who can take care of themselves and the educational system would provide the opportunity to deliver training to accomplish that goal.

As mentioned above, even though there are goal-oriented objectives to the educational system, the educational process would more appropriately fit into the Parson typology of low contingency of action and low symbolic complexity. Learning has historically been conducted in a highly structured environment, although some distance learning techniques can reduce the amount of structure. The educational system has to treat participants in a monocronistic manner adhering to a single set of norms and operating in a synchronous mode. These are the characteristics of what Parson calls the “action system”.

A View from Conflict Theorists:

The role of the educational system is an important part of the conflict process according to Karl Marx. Marx’s propositions on the conflict process include the concept that the expansion of educational opportunities for members of the subordinate group facilitates the communication of grievances among the group members which helps them
form their true collective interests (Turner 1997, pp. 157). Additionally, the greater the unification of members of the subordinate groups, the more likely that the conflict will be violent. This theme is also reflected in Coser’s and Dahrendorf’s propositional inventories wherein they posit that the failure to define true interests, independently of core values, is negatively related to the violence of conflict (Turner 1997, pp. 181).

Conflict theorists would see the control of the educational system as an important means of controlling the distribution of power and property. The Theory of Learning Performance (Figure 3) posits that learning is a means to an outcome. That outcome is the attainment of a goal. Therefore only those people able to participate in the learning process will be able to attain these goals. By controlling access to the educational system, the dominant group is able to determine who will be able to perform certain tasks and fill certain positions in the division of labor. As a result, the conflict theorists would emphasize the unequal distribution of the educational resources and see it as a source of conflict. The subordinate group, deprived of the ability to obtain power, prestige, and property, would rise up and demand access to learning resources.

On the other hand, participation in the educational system could also serve as a controlling function. C. Wright Mills noted that public education system produces conformity. He saw society’s institutions forcing personalities to adapt to the needs of the organization. This means that a dominant group that controls the educational system itself could use that power to control the actions and values of subordinate group students who participate in the process. This sentiment was further elaborated on by Bowles and Gintis (1976, 108) who state that “The predatory, competitive, and personally destructive way in which intellectual achievement is rewarded in U.S. schools and colleges is a
imply that he would see distance learning as ineffectual. Of course in the late 1800s and early 1900s the concept of electronic communication was not known; but presumably he would not respect the idea.

Randall Collins, however, presents arguments that favor Internet-based learning. Collins defines social structures as being built from “interaction rituals” that have been strung together over time. These rituals occur when individuals are co-present, such as in a classroom setting. However, he posits that the nature of the talk occurring in such an encounter changes dramatically when there is inequality in the resources of the participants (Turner 1997, pp. 186). In the classroom there is an inequality between the teacher and student. Again, according to Collins, this inequality will result in conversational exchanges that are impersonal, highly routinized, and short-term. However, in situations where actors are not co-present then the conversational exchanges should remain robust. Studies done in the area of decision support systems and distance learning have supported the notion that student-to-student interchanges are richer than teacher-to-student interchanges. The Internet technologically enables these interchanges and has been shown as enhancing learning especially when the interchanges are anonymous.