Teaching for permanent learning

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Abstract

Increasing the retention of course material through the development of interests and thinking abilities is discussed. The basic principles of interest and thinking are enumerated with respect to their use in the classroom.

Much of the knowledge that students learn in school seems to be forgotten after the last exam. The reasons for this vary from teacher to teacher, but one reason stands out, and that is that the total mass of knowledge learned is so great that none of it can be learned well. Too often students are required to memorize a body of facts which are much easier to forget than to remember. Teaching for permanent learning must go beyond dissemination of information to the development of student interests and thinking abilities.

Interests are direct or indirect determiners of all the essential parts of a true education. They determine the ideals and goals for which a student will strive. They play a decisive role in the development of his thinking ability by determining what he will think about and how intently he will think about it. Finally, by influencing his activities, they help determine what knowledge he will retain, for knowledge that is used is retained much longer than that which is not.

Creating Interest

That interest can be created and controlled has been proven by novelists, poets, and playwrights. To guide teachers in creating student interest in their course, certain principles of interest have been outlined (1, 4) which can be used in instruction where appropriate. In summary, they are:

1. All interest apparently has its original source in the so-called natural impulses, urges, or drives, among which are useful to teachers: activity, love of nature, curiosity, gregariousness, creativeness, desire for approval, altruism, self-advancement, competition, and ownership.
2. That is interesting which affects ourselves, others about us, or humanity at large. Take advantage of opportunities to connect facts being studied with interesting people, events, or experiences.
3. Interest increases with an increase in related knowledge of any subject, provided such knowledge is well understood. Tie in topics or facts from other courses in which the students are interested.
4. Interest increases with the acquisition of any given ability or skill. If a person can do something particularly well, he will usually be strongly interested in it. It may seem that the interest developed before the skill, but that is not ordinarily true.
5. When teaching a principle, search out and use one or more interesting applications of it. In general, try to teach principles and applications together.
6. Interest flows from an interesting thing to an uninteresting thing whenever the two are clearly connected in thought. This is not used to create interest, but to lead it from subject to subject after it has been generated. A common mistake of teachers is to fail to maintain the relationship between the topic of interest and a new topic, resulting in loss of student interest.
7. Thinking is essentially interesting; memorization uninteresting. Teachers should keep students thinking as much as possible and require no more memorization than necessary.
8. Interest is contagious and can spread from one person to another. A teacher's interest is the best source of pupil interest.
9. Interest is strengthened by a sense of progress. Make the students feel they are reaching a goal.
10. Interest is created and sustained by a state of suspense. When guiding group thinking, hold back what the students want to know until they have formulated their own answers.
11. The novel and unexpected are interesting. Try new and different ways of doing things.
12. Humor creates interest. It can be overdone, but instead is rarely used enough.

These principles of interest mean nothing until they are applied—use them.

Learning and Thinking

An element of student behavior which greatly increases retention of subject matter is thinking. Through thinking, students become actively involved in learning instead of passively accepting a list of facts. This leads to increased retention in two ways. First, the number of associations made with the material is increased, for as one thinks, he connects current material with past associations, images, and memories. All other things being equal, the likelihood that a needed fact will be recalled is directly proportional to the number of its associations (2, 6). Second, thinking results in the arrangement of facts in memory, classified according to various principles learned. It has been shown (3, 5) that associations with well organized material are retained much longer than a disorganized mass of associations.

To increase the retention of subject matter is reason enough for teachers to stimulate thinking. But there is another equally important reason, and that is to help students become well organized, independent thinkers. It is

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possible to make critical thinking a habit of students, but only if they are forced to think regularly. Thinking is not easy. It is much easier to accept what someone else says or agree with a book's answer than actively to think of an answer for oneself. It is human nature to think only when we must, when no other form of mental activity, such as instinct, habit, or memory, brings the desired response. Development of good thinkers should be an objective of every course. Teachers should not totally rely on textbooks, lab manuals, and lectures which require only memorization of facts.

As a starting point, all teachers should know what constitutes good thinking so that poor thinking habits are not developed. Good thinking is the application of a modified scientific approach to the solution of a problem and includes these steps:

1. **Define the problem.**
2. **Accumulate relevant and reject irrelevant data.**
3. **Formulate possible solutions.**
4. **Test the proposed solutions.**
5. **Evaluate the results and draw a conclusion.**

By leading students repeatedly through this process, teachers can develop the habit of good thinking in their students; a habit which may be of more value to them than the material of the course.

The teacher who has done a good job of preparing course objectives[1] and content and has generated interest in the material has gone a long way toward solving the problem of how to stimulate thinking. All that remains to be done to encourage student thinking is to create a felt need in them. This can be done by showing students they need to acquire certain knowledge or abilities to reach their goals, or by challenging them with problems that have worthwhile solutions. "The ideal lecture should start with a problem which is meaningful to the student, presented in such a way that the average student would figure out the solution for himself before the teacher pointed it out."[2]

Developing the Habit of Thinking

The best way for teachers to direct a question-discussion session is to follow the modified scientific approach to the solution of a problem.

1. Define the problem. The most important aspect of this procedure is the creation of the questions or problems. They must be thought provoking and not simply require memorized facts for answer. Questions should create in the students a feeling of need for the solution to the problem and make them anxious to learn the answer. In addition, the students must be in a state of readiness for the questions, meaning they must have the basic background knowledge needed to answer or intelligently discuss them.
2. Accumulate relevant and reject irrelevant data. Call for the students' answers. Poor thinkers give the first answer that seems right to them, then sit back. Good thinkers maintain an open-minded, but critical, attitude and evaluate all possibilities. The teacher must do two things at this point. First, get all students actively involved, making a special effort for students who seem to be poor thinkers. Second, restate the question a number of times during the discussion to make sure it is clear.
3. Formulate possible solutions. As the students reach their conclusions, ask for the reasons, both affirmative and negative, upon which they were based. This will increase the number of associations related to a subject and increase its retention. In addition, one's understanding of a subject becomes clearer through explaining it. At this point the teacher must begin to settle differences of opinion that will undoubtedly arise.
4. Test the proposed solutions. Give the students examples or additional facts with which they may not be familiar. Generally, do not explain anything they are able to think through for themselves. A student's attempt to think through a problem before receiving help will ensure a clearer understanding of it in the end. This principle must occasionally be compromised for time's sake.
5. Evaluate the results and draw a conclusion. Through proper questioning, students can be made to think, recall, make new associations, and reach conclusions which they never reached before. The teacher must then summarize the objective and solution of the problem so that it is understood by everyone.

Material learned in this way has many associations, is well organized, and has been assimilated through active thinking. It is much more likely to be retained than material learned through the standard textbook lecture or by memorization. Though time may prohibit teaching an entire course using all of the principles of interest and thinking, these principles should be used as often as possible.

Direction of Outside Study

Teachers also influence student learning through the direction of their study. In this area the concept of free attention versus forced attention (6) becomes all important. Free attention is given when the subject of attention satisfies a need of the student and is given voluntarily. The chief characteristic of free attention is its unity, which is derived from the appeal of a situation. The mental activity of the student is all directed along one line, that which leads to the satisfaction of a need. As a result, the attention is likely to be concentrated and can be sustained for a long period of time, resulting in the completion of much more, and better, study.

[1]For instruction on preparing objectives, read: Mager, R. F., *Preparing Instructional Objectives*. Lear Siegler, Belmont, California. 1962.
[2]McKeachie, W. J., *Teaching Tips*. 6th edition. Page 24. D. C. Heath Co., Lexington, Mass. 1969.

Forced attention results when there is no felt need connected with the subject of attention. Attention is only given because of fear of the results if it is not. A strained condition exists because the attention is divided between actually doing the work and thinking of more attractive things to do. As a result, forced attention cannot be maintained for long periods of time; it is not concentrated; and it is extremely fatiguing.

Attention

It is easy to see that teachers should make an effort to attract students' free attention. If they can do this, the students will work harder and think more about the subject matter. This will result in more associations being formed and better organization of the material in the student's mind, hence better retention of the material.

But forced attention also has a certain value and is required when a group of facts must be learned before they can be applied to more interesting problems. It is a means to an end that should be called into play when needed, but the sooner students can return to free attention, the better, for it is only as it leads to free attention that forced attention is truly valuable.

If the teacher has done a good job of creating a felt need and arousing interest in class, and the study material is a continuation of the class material, obtaining the students' free attention will be no problem. However, if the material is supplemental in nature, the teacher must show how it is related to the class material and how it will help the students reach the goal of the course before it will get their full free attention.

Memorization

Memorization of facts is basically uninteresting and requires forced attention. It rarely involves good thinking or results in the development of higher mental processes. Requiring students to give forced attention to memorization is justified, though, when there is information which cannot be gained in any better way and is essential for forming proper associations and thinking during free attention. Memorization is useful, though, only when it does not extend to areas where teaching understanding would be better.

Free attention is given more readily to study involving thinking because it is more interesting than memorization. Thinking during study can be stimulated by assigning questions or problems which require detailed explanations for answers rather than simple facts. This also helps students gain a better understanding of the material, for one's understanding of a subject becomes clearer through explaining it to others. The questions should be given in a way that will lead the student from principle to principle and result in the orderly organization of the subject matter in the students' minds. Each assignment should have certain specific objectives so that the students will know what they are supposed to learn. These objectives can be used by the students to guide their study and will also encourage and facilitate self-testing.

Summary

There are three basic objectives which teachers should strive to meet:

1. **To disseminate knowledge.**
2. **To stimulate good thinking.**
3. **To develop lasting interests.**

In the dissemination of knowledge teachers should require the learning only of essential facts. Students should not be required to learn nonessential facts, but they should be made able either to infer them from essential facts or find them when they need them.

Knowledge is useful only as it is applied through critical thinking. Memorization can only result in the reproduction of past experiences, while thinking produces new ideas and concepts. Many facts we learn are quickly forgotten, but the ability to think and create new ideas can be used throughout a lifetime. It is, therefore, the responsibility of teachers of all courses and at all levels to stimulate good thinking by their students, for the ability to think is developed through continuous use, not in one course.

Finally, it is in interests that teachers have their greatest tool and their greatest obligation. By developing interests in students, every other aspect of teaching is made easier. Students will give forced attention to the memorization of facts relating to a subject in which they are interested much more readily than to a subject in which they are not. Interest inherently stimulates thinking and makes it easier for a teacher to obtain the active participation of students in classroom discussions and study. It is through active participation that a student's thoughts are organized and associations are made, both of which result in better retention. The development of interests is also an obligation, for if a student leaves a course with no interest in the material he probably will not use it or think about it, and he will surely forget it. By developing lasting interests in the material, the teacher is ensuring its use and retention.

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