

PEDAGOGICAL STRATEGIES THAT PROMOTE LEARNING TRANSFER

A STUDY ON STUDENT PERCEPTIONS



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CONTEXT

While educators are responsible for establishing conditions that promote sustainable and transferable learning, how, in concrete terms, do we ensure that students learn effectively and take an active part in the process? After some 20 years in the field, thanks to my involvement in discussions on the learning paradigm and participation in various professional-development activities, I felt the need to explore how teachers can help students learn, from a student point of view.

This article summarizes the main results of a study I conducted as part of my Master's degree in the winter term of 2015, at which time I developed an interest in student perceptions of pedagogical strategies that promote learning and the transfer of knowledge to new situations (Joanis 2015). The findings of that study, while closely associated with a Social Science curriculum, are not limited to those courses exclusively; they can easily be applied to other educational contexts—in particular, other technical-program courses or internships.

RESEARCH CONTEXT

In all, 96 students enrolled in the CÉGEP de l'Outaouais's "Practical Introduction to Social Science" (IPMSH) course provided data at the beginning of the semester; at the end of the term, eight of them also took part in discussion groups.

Why this course?

The Social Science program features two mandatory methodology courses aimed at helping students demonstrate scientific and critical thinking appropriate to the program (CÉGEP de l'Outaouais 2013). The first course, entitled "Social Science Quantitative Methods" (MQ), develops a competency and skills to be used in carrying out a major research project in a subsequent course (IPMSH). As regards the latter, the ultimate goal for students is to conduct scientific research based on a social-science-inspired method; in so doing, they must mobilize the competency developed in the MQ course, so as to properly carry out the steps of data collection and presentation/discussion of results in keeping with the scientific method.

The combination of these two courses is all the more interesting in that it is multi-disciplinary—i.e., it is given by instructors from all Social Science disciplines,¹ who explore the content from the viewpoint of their own particular specialization. That same multi-disciplinary character, however, also adds to the learning and transfer challenges involved.

What exactly is "learning transfer"?

Learning transfer refers to the effective re-use, in a new context, of previously acquired knowledge (Legendre 2005; Tardif 1999). It is not, therefore, simply the automatic transposition of knowledge without reflection, but a true mobilization and implementation of complex cognitive activities, in which students must unceasingly build and rebuild their learning to adapt to different circumstances (Perrenoud 1997; Tardif and Meirieu 1996). However, this ability to transfer knowledge is not inherent; at the beginning, knowledge is indissociable from the learning context. According to Frenay and Bédard (2006), it is important to support students in the transfer process so as to help them properly adjust their learning, taking account of how the new context or situation has been changed. This involves an ongoing process of adaptation, in which students must perceive connections between the two contexts. In my study, students first had to perceive the links and relationships between the MQ-IPMSH courses so as to subsequently mobilize the pertinent MQ knowledge applying to the new situation when carrying out their research project.

THE CONCEPT OF LEARNING AND MOTIVATIONAL DYNAMICS

Before continuing our discussion on the potential for course-to-course learning transfer and the pedagogical strategies

¹ The Social Science disciplines offered at the CÉGEP de l'Outaouais include Administration, Anthropology, Geography, History, Mathematics, Political Science, Psychology, and Sociology.



involved, it is important to clarify exactly what we mean by “learning”. While this concept has been defined in many ways and is of interest to a variety of disciplines, many of the elements of the various definitions relate to learning in an academic environment. By and large, the act of learning involves a transformation; students may act or think differently after learning takes place (Gagné 1976; Vienneau 2004); they are then able to use the new knowledge or skills in a manner suited to the circumstances involved (Frenay and Bédard 2006; Legendre 2005). Accordingly, learning is an active process that demands *cognitive engagement* (Tardif 1992). In other words, students do not learn passively; they must constantly choose which information is appropriate to a given context, and make it meaningful. According to Bourgeois (2006), learning is often hard work that requires real involvement and commitment.

It is pertinent here to mention Viau’s model of motivational dynamics (2014), which states that, for students to be cognitively engaged in an educational activity for the purposes of learning, they must see it has a certain value. This *perception of value* corresponds to the belief that the activity is useful or interesting. Thus, when students consider an educational activity valuable, they will undertake more demanding tasks that help them understand and master the material rather than simply learning it by heart. The knowledge acquired can then be transferred to other contexts.

Similarly, the *intrinsic motivation* demonstrated by students positively influences their engagement in and performance of a given academic task (Bourgeois 2006). The level of intrinsic motivation is thus important for learning and its transfer, as it involves a significant investment and the determination to know more (Darnon and Butera 2005). If students become engaged by displaying intrinsic motivation, they are more likely to be invested in learning and successfully complete their courses, thereby benefiting by the acquisition and transfer of new knowledge.

Another factor in Viau’s model of motivational dynamics (2009) also affects students’ engagement in learning; their *perception of competence*, i.e., to what extent they feel capable of properly carrying out the educational activity in question. We should stipulate here that the concept of *perception of competence*, which reflects students’ views on a given educational activity, affects cognitive engagement, perseverance, and learning. Viau adds that students’ perceptions of their own competence appears to better predict learning behaviour than actual ability. As concerns my study, students’ judgment on their competence was limited to the course on quantitative methodology; the

question was to explore which of the pedagogical strategies used by their MQ instructor helped them learn—and feel comfortable transferring that learning—when doing the final assignment for the next course (IPMSH).

► PEDAGOGICAL STRATEGIES

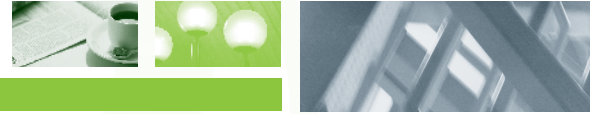
What does the concept of pedagogical strategy mean?

The literature states that a strategy consists of a series of instructor-planned operations and actions that should theoretically help students learn (Legendre 2005). What is interesting about exploring the topic of pedagogical strategies is that, because they involve specific actions, they may be identified and observed by parties who have not taken part in their planning (Déseautels 1976). As my research focused on what students could observe in the classroom, I hoped to discover how these strategies *were seen by* students rather than how they were planned by teachers; the ultimate goal was to understand, from a student viewpoint, which strategies helped them learn and transfer their knowledge to new situations.

Students will make the effort required to participate in an pedagogical strategy or educational activity if they deem it relevant for learning.

When providing data, students were asked to list from memory all pedagogical strategies used in the MQ course, and assess (on a Likert-type scale going from 1 to 6) to what extent those strategies had positively affected their engagement and made them feel competent, not only regarding the course itself, but also concerning their ability to eventually transfer their knowledge from the MQ course to the IPMSH research project. The questionnaire also included items on their intrinsic motivation. By triangulating the data, I was able to determine which pedagogical strategies *were perceived as helpful* in promoting learning and knowledge transfer.

In all, the students identified 388 pedagogical strategies. Subsequent to agglomerative hierarchical clustering (a bottom-up statistical method in which clusters have sub-clusters, which in turn have sub-clusters, etc., the classic example being species taxonomy), I was left with 13 different types of strategies distributed across three categories. In the course of my analysis, however, a fourth category emerged: the nature of the educational relationship concerned—i.e., the instructor’s personality and attitude. Because the latter are closely related to pedagogical strategies, they were incorporated into the first category.



- **Pedagogical strategies/Attitude**

The methods used by instructors to teach (e.g., teamwork, lectures, flipped classroom) and how they do so, as a function of their personality and attitude.

- **Learning Activities**

What students are asked to do in order to learn (e.g., readings, exercises, homework, article searches).

- **Teaching Aids**

The materials used by instructors (e.g., reference works, course notes, and PowerPoint presentations).

Table 1 presents the various pedagogical strategies involved.

TABLE 1		PEDAGOGICAL STRATEGIES MENTIONED BY THE 96 STUDENTS
Category	Strategy	Time mentioned
Pedagogical strategies/ Attitude	Discussions/Understanding attitude	16
	Demonstrations/examples/humour	18
	Reviews/explanations	25
	Interactive presentations	41
	Total	100
Learning Activities	Excel labs and formative activities	57
	Exercises, homework, and group activities	95
	Projects and peer instruction	14
	Prior reading and workshops	12
	Total	178
Teaching Aids	PowerPoint and flow sheets	52
	Textbooks and fill-in-the-blank exercises	37
	Visual aids (board, projector, videos)	21
	Total	110
Grand total		388

The pedagogical strategies identified by the students can be divided into four categories. The first features an ongoing discussion between teacher and students; it may be referred to as the “dialogue approach”. This strategy involves an understanding attitude on the part of the instructor, as well as considerable affective and cognitive accessibility, both in and outside of class. This addition of a relational dimension is what distinguishes this category from that of the interactive

presentation, although both types involve a dynamic aspect between teacher and students (this distinction may indicate that a relational dimension has a role to play in the perceived efficacy of pedagogical strategies). The second type combines the explicit demonstration of course content with the use of frequent and varied examples, the whole being infused with humour. The third type involves the use of clear and frequent explanations, content review, the revisiting of previously-acquired theoretical knowledge, and the establishment of links among different courses by a patient instructor who takes time to properly explain matters. The last and most frequent type involves lectures that incorporate teacher-student interaction, but without mention of any particular attitude.

Learning activities and teaching aids also fall into different groups, but, as they add nothing to our comprehension of pedagogical strategies *perceived* as efficacious, the details of those analyses are of no interest here.

PERCEIVED EFFICACY OF PEDAGOGICAL STRATEGIES ON LEARNING AND KNOWLEDGE TRANSFER

For each pedagogical strategies concerned, students were asked to indicate how effective they were in helping them learn. Those rated 4 (“fairly useful”), 5 (“useful”) or 6 (“extremely useful”) were grouped together and classified as “effective” for the purposes of the study. Table 2 below sets out these views. Percentages represent the relationship between the number of times a given strategy was rated as effective for learning or knowledge transfer and the number of times it was mentioned by students.

According to students’ responses, 84% of the pedagogical strategies used by their MQ instructor had helped them learn; similar ratios were also observed in relation to learning activities (90%) and teaching aids (84%). No one category stood out from the others in terms of statistical significance.

The same analysis was completed with respect to perceived competence at transferring learning via a given pedagogical strategy. A total of 66% of pedagogical strategies used by MQ instructors were seen as eventually promoting learning transfer. Learning activities, for their part, were perceived favourably for knowledge transfer 79% of the time and, lastly, teaching aids were considered effective for knowledge transfer 74% of the time. However, no significant differences exist among these three categories. Similarly, from the students’ point of view, no single pedagogical strategy, learning activity, or teaching aid stood out when it came to helping them transfer what they had learned from one course to the other.



TABLE 2 BREAKDOWN OF PEDAGOGICAL STRATEGIES ACCORDING TO PERCEPTIONS OF EFFICACY: LEARNING (MQ COURSE) AND KNOWLEDGE TRANSFER (IPMSH COURSE)

Pedagogical strategies/Attitude		
Strategy	Learning Oriented	Transfer Oriented
Discussions	82%	73%
Demonstrations/Examples	93%	87%
Reviews/Explanations	94%	89%
Interactive Presentations	76%	46%
Total	84%	66%
Learning Activities		
Strategy	Learning Oriented	Transfer Oriented
Excel/Formative Activities	91%	56%
Exercises/Homework	93%	79%
Projects/Peers	93%	93%
Workshops/Readings	58%	50%
Total	90%	79%
Teaching Aids		
Strategy	Learning Oriented	Transfer Oriented
PowerPoint	85%	75%
Textbooks and fill-in-the-blank exercises	78%	70%
Visual Tools	90%	76%
Total	84%	74%

When we compare the perceived efficacy of pedagogical strategies mentioned by students as regards learning and transfer, however, a new test shows a statistically significant difference between the perceived efficacy of pedagogical strategies as regards learning and transfer. According to the students, the strategies used by faculty who taught the MQ course enabled them to learn the material, but not necessarily to feel capable of transferring learning to another context (i.e., the final assignment of the IPMSH course). By way of illustration, as regards the interactive presentation (the strategy most often mentioned by students), 76% of respondents felt it had an influence in helping them learn in the MQ course, but the figure fell to 46% with respect to perceived ability to transfer that learning to the IPMSH course.

EFFECTS OF INTRINSIC MOTIVATION AND FEELINGS OF COMPETENCY ON PERCEIVED EFFICACY OF PEDAGOGICAL STRATEGIES

One of my concerns when conducting the study was whether the perceived efficacy of pedagogical strategies was affected by students' intrinsic motivation as well as their perception of competence.² Different statistical analyses made it possible to classify the 96 students into sub-groups of unequal numbers and, in particular, measure their:

- perceptions of competence as regards what they learned in then MQ course;
- perceptions of competence in transferring that learning to the IPMSH course; and
- level of intrinsic motivation.

Given the particular characteristics of each sub-group, the degree of importance ascribed by students to the pedagogical strategies concerned—as well as their effects on students' perceived ability to transfer—varied.

For students who demonstrated a high level of intrinsic motivation and felt competent about transferring what they had learned in the MQ course, as well as their ability to use that knowledge in the IPMSH course (19% of the sample), the pedagogical strategies implemented in the former did not have much of an impact. These students also tended to attribute their feelings of competence to their intrinsic personal qualities (e.g., the effort they put in, their organizational skills, natural curiosity, or self-taught status). We may infer that these individuals were capable of a strong performance regardless of their teacher's strategies.

However, for students who demonstrated low intrinsic motivation (26% of the sample) or whose perceived competence relating to what they learned in the MQ course was lower (81% of the sample),³ the pedagogical strategies concerned are vital to student success. These students attributed their perceived competence to their MQ instructor's pedagogical strategies and his or her personal characteristics (e.g., humour, patience, or accessibility). Moreover, even though most stated they had learned from the MQ course, they additionally said they still

² It should be noted that the other items measured by the questionnaire, such as sex, the Social Science profile elected, the semester involved, choice of career, familiarity with Excel, and successfully completed high-school math courses were also cross-tabulated with the dimensions in question (see three bullet points above). None of these factors helped enhance our understanding of these dimensions.

³ This was common to several groups. Note that the students were not divided in accordance with only one factor, but rather with the combination of their scores on each one.



had a negative perception of their competence with respect to transferring that knowledge to the IPMSH course.

An open-ended question on the questionnaire helped identify how students explained whether or not they felt competent transferring what they had learned in the MQ course to their IPMSH project. I found one result particularly noteworthy: more than 17% of students did not perceive any link between the two courses. Because they were unable to see how the learning acquired in the first course could be transferred to the final-assignment context of the second, it was problematic for them to feel competent to effect such transfers. One of the premises for knowledge transfer is that learners see the similarities in two different contexts. With respect to the courses in question here, this does not seem to always be the case, as the relationship between them is not necessarily perceived by students. Frenay and Bédard (2006) mention that, as concerns knowledge transfer, what is going on in students' minds is what becomes important. It is therefore up to instructors to be responsible for making the links between the two contexts explicit, so as to promote a potential transfer (Barth 2004).

By their attitudes, educators can positively influence students' opinion of their own sense of competence.

PEDAGOGICAL STRATEGIES PERCEIVED AS EFFECTIVE FOR LEARNING AND KNOWLEDGE TRANSFER: COMMON ELEMENTS

Forming discussion groups of eight volunteer students from the sample greatly enhanced our understanding of the pedagogical strategies deemed successful and effective as regards learning and knowledge transfer. Participants took advantage of this forum to stipulate that, regardless of the course involved, it is indispensable that instructors personalize the material by providing specific examples, giving their students access to their world view, interacting dynamically with the group, and demonstrating a positive attitude about the class and course. By their attitudes, educators can positively influence students' opinion of their own sense of competence. Taking care to build a constructive relationship with their students, especially in a course like MQ, is notably crucial—to the point that it should underlay all pedagogical strategies. Discussion-group participants systematically mentioned that an instructor who “was there” for them and demonstrated accessibility, empathy, and interest was vital to the effectiveness of any such strategy and to helping them develop and maintain their intrinsic motivation. This finding is an important emerging aspect of the study, as it in no way formed part of the initial framework.

With respect to the MQ course in particular, participants appreciated pedagogical strategies such as the step-by-step demonstration of a problem or process, whether on the board or in the lab, as this helped them understand how the instructor solved the problem (giving them access to the thoughts of an expert); clear and varied explanations that helped them explore concepts from different angles; and the use of examples or analogies that facilitate understanding. The students added that, above all, what helped them stay motivated was instructors who were passionate about the subject matter.

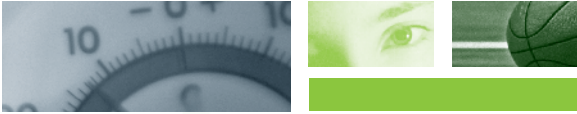
CONCLUSION

In concrete terms, what can we do to help students learn effectively and transfer knowledge?

My findings paint a picture of students who, for the most part, had considerable intrinsic motivation with respect to their methodology courses, but also varied in their perceptions of their own competence as concerns transferring learning from one to another. The needs they expressed as regards pedagogical strategies depended on their motivation and feelings of competence. As we know, students will make the effort required to participate in an instructional or an educational activity if they deem it relevant for learning. An unpopular strategy that results in feelings of incompetence, even if it has the potential to assist in learning, will not reach its goal, as students will respond negatively. Similarly, to ensure that students are capable of transferring what they have learned from one context to another, the pedagogical strategies used must make the relationship between those situations explicit. In the courses of interest here, the strategies used in MQ should enable students to identify which concepts could be transferred to an IPMSH context and grasp how those concepts could be re-invested in their personal research.

For a minority of the students involved, the instructor's pedagogical strategies only indirectly influenced their learning, performance, and transfer abilities (aptitudes they attributed to their personal competence). However, for more than 80% of the group, strategies seemed to considerably influence learning; they were especially insistent on the fact that the teacher had to be passionate about the material and that the strategy used had to involve:

- an in-depth explanation by the instructor (rather than independent learning by reading, for example);
- the use of familiar, simple language to explain the material;



- a concrete demonstration of the process involved;
- a description of how the material is relevant to daily life or current events;
- an explicit demonstration of the links between situations to promote an eventual learning transfer;
- the use of the strategy within a positive teacher-student relationship.

For an pedagogical strategy to be effective or conducive to learning and knowledge transfer, students said it must be supported by a significant relationship with instructors; students had to have access to their teachers' thoughts and vision, even their knowledge-structuring process. This accent on the establishment of a positive teacher-student relationship concerns every action involving between instructors and their classes. As mentioned by Barbeau (2007), this is an affective and cognitive relationship.

Despite the fact that many educators intuitively adopt a receptive attitude, nothing having to do with learning and knowledge transfer is either intuitive or easy. In a college context in which faculty are disciplinary specialists, students mentioned that, to be good teachers as well as experts, they also must be good educators. This is not a skill that can be improvised. Practices depend on both the instructor's values and views, ability to make his or her students learn, and students who are involved in the process (Dorais and Laliberté 1999; Ménard and St-Pierre 2014). Having students learn means operationalizing an approach planned and structured by passionate instructors who want to establish a positive relationship with their students. Accordingly, it is indispensable to ensure that, in Quebec colleges, the means and measures required to properly train teachers be established or maintained. ◆

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