# Critical Review of J.Vermunt's Learning Patterns Model*

## Revisión crítica del modelo de patrones de aprendizaje de J. Vermunt

## Revisão crítica do modelo de padrões de aprendizagem de J. Vermunt

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Review

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## Abstract

The paper is a critical review of J. Vermunt´s learning patterns model to understand individual differences in learning. After a general description of the model, its main characteristics and the Inventory of Learning Styles (ILS) instrument - used in its operationalization -, the paper offers a critical analysis of three aspects that are considered problematic in the model: the definition of the "undirected" pattern and its operationalization in the ILS; the model's Eurocentric cultural bias, and the low coherence levels between the model and the parameters usually used to define higher formal education. The paper concludes with a series of constructive suggestions to improve the model in its specification and generalization..



## Keywords

Learning processes, learning strategies, individual differences, cultural differences, learning activities



## Resumen

El artículo es una revisión crítica del modelo de patrones de aprendizaje de J. Vermunt para la comprensión de diferencias individuales en el aprendizaje. Luego de una descripción del modelo, sus principales características y el instrumento *Inventory of Learning Styles* (ILS) —utilizado para su operacionalización—, se lleva a cabo un análisis crítico de tres de los aspectos que se consideran problemáticos en la propuesta: la definición del patrón no dirigido y su operacionalización en ILS; el sesgo cultural eurocéntrico presente en el modelo y el bajo grado de concordancia entre este y los parámetros de lo que se concibe como educación formal en el contexto universitario. El artículo concluye con una serie de propuestas constructivas que pretenden contribuir a precisar y universalizar el modelo.



## Palabras clave

procesos de aprendizaje, estrategias de aprendizaje, diferencias individuales, diferencias culturales, estilo de aprendizaje



## Resumo

O artigo é uma revisão crítica do modelo de padrões de aprendizagem de J. Vermunt para a compreensão das diferenças individuais na aprendizagem. Após a descrição do modelo, suas principais características e o instrumento Inventory of Learning Styles (ils) - utilizado para sua operacionalização -, é realizada uma análise crítica de três dos aspectos considerados problemáticos na proposta: a definição do padrão não direcionado e sua operacionalização em ils; o viés cultural eurocêntrico presente no modelo e o baixo grau de concordância entre ele e os parâmetros do que é concebido como educação formal no contexto universitário. O artigo conclui com uma série de propostas construtivas que visam contribuir para esclarecer e universalizar o modelo.



## Palavras-chave

Processos de aprendizagem; estratégias de aprendizagem; diferenças individuais; diferenças culturais; estilo de aprendizagem

## Introduction

The learning patterns model, developed some 20 years ago by the Dutch educational psychologist Jan Vermunt, has represented important progress in conceptualizing individual approaches to learning in formal educational contexts. The model's main virtues are that it proposes a complex view of learning by integrating cognitive, affective-motivational, and regulatory aspects, and raises the possibility of pattern changes through pedagogical processes. However, the model has certain characteristics that are worth discussing, and ultimately, revising. The purpose of this article is to begin this discussion in our context.

To accomplish this objective, we will begin with a description of the basic aspects of the learning patterns model, identifying the elements that compose it and the classical patterns it describes. Once this is done, we will address a second level description, where we will present its distinctive characteristics and a characterization of the main instrument used to determine it (the ILS). Once the latter is completed, we will present the critical review of the model.

Said critical review will be organized in three parts: the first part analyses the non-directed pattern, both from the point of view of its definition and its operationalization in the instrument identifying it (ILS subscales). In the second part, we will examine the model's transcultural condition and review some learning pattern proposals present in non-European student populations. In the third part, we will try to take a more general viewpoint to examine the model and its relationships with the educational system. We will conclude with a synthesis of that presented and some suggestions for revising and developing the model.

## Description of the Learning Patterns Model

According to Vermunt (2005), a learning pattern is understood as a coherent whole of learning activities, certain beliefs about this process, and certain motivations to learn; a whole that is a particular feature of each student during a certain period of time. Since in each of these learning components - strategies, beliefs, and motivations - it is possible to find a great diversity of actions, postures, and attitudes, the learning patterns are varied and can be used to characterize individuals and/or student populations.

In the context of studies of individual differences in learning, the 'pattern' construct finds affinities with at least two others: the concept of style, cognitive or learning, and of learning approach. Evans and Vermunt (2013) use the acronym SAP[1] (Styles, Approaches, and Patterns) to express

1 A kind of wordplay to relate this expression to SAL, Student's Approaches to Learning.

this conceptual brotherhood and propose a way to establish the differences between them. While styles are determined by factors of a personal nature and approaches are influenced by contextual factors, learning patterns are subject to factors of both a personal and contextual nature (Vermunt, 2005). Some of the individual factors that influence the learning pattern are, for example, age, sex, or personality traits. On the other hand, some of the contextual determinants of the learning pattern would be the learning content, the pedagogy implemented by the teacher, the structure of the educational situation in which learning occurs, among others.

In addition to the double scheme of personal and contextual influences, the concept of pattern has another strength: it comprises a set of components that encompass elements of a conceptual, motivational, metacognitive and strategic nature; which gives the proposal a complexity rarely seen in the context of SAP. In particular, a learning pattern covers four components, namely:

- A specific belief or conception about what it means to learn and how learning is achieved. Thus, for example, while a student may conceive learning as a construction process that gives meaning to some portion of the experience, another may understand that it deals with the action by which certain information is incorporated into memory.
- An orientation or motivation towards learning that guides the process to a certain direction and gives meaning to the process from an emotional point of view. In this sense, for example, while some students are guided in their learning because it enables them to exercise a career, others are oriented toward learning itself and the satisfaction its achievement brings.
- A set of strategies that allow, or do not allow, regulating the learning process through information that can come from the novice themselves, from external agents, or from both sources.
- A set of processing strategies that give rise to learning and ranging from repeating to memorize, going through preparing or analyzing information, until critical-type strategies, such as relating information from several sources or asking questions that problematize the content at stake.

These four components: beliefs, orientations, regulatory and processing strategies, account for what happens during learning and give the process a very complete meaning. But these are not components independent of each other; the different values each take on, find correspondence with the values of the others, forming a pattern with internal coherence. Vermunt (1998) then defines four learning patterns: 1) MD: Meaning Directed, 2)

AD: Application Directed, 3) RD: Reproduction Directed, and 4) UD: Undirected. Table 1 shows each of these patterns described according to the values taken on by each learning dimension.

**Table 1. Learning patterns and their descriptors.**

| | Meaning Directed (MD) | Application Directed (AD) | Reproduction Directed (RD) | Undirected (UD) |
|---|---|---|---|---|
| Conceptions | Knowledge Construction | Use of knowledge | Knowledge Accumulation | Cooperation and being stimulated by the teacher |
| Orientations | Personal interest | Vocation | Certificate<br>Self-evaluation | Ambivalent |
| Regulation | Self-regulation | Self-regulation<br>External regulation | External regulation | Lack of regulation |
| Processing | Deep | Specific | Step-by-step and analysis | Very scarce |

Source: Based on Vanthournout, Donche, Gijbels, & Van Petegem (2014)

Read horizontally, table 1 shows the categories corresponding to each of the components described in the model. Read vertically, the table allows a description of the four patterns identified by Vermunt.

It is necessary to mention an important issue at this point. The four patterns proposed by Vermunt are the result of extensive empirical work with the Inventory of Learning Styles (ILS questionnaire) developed by Vermunt in 1998. While some studies corroborate the result achieved by Vermunt (Busato, Prins, Elshout and Hamakerm, 1998 or Vázquez, 2009), in other works, these four patterns do not concur with the same clarity (Ajisuksmo and Vermunt, 1999; Boyle, Duffy and Dunleavy, 2003; Martínez-Fernández and García-Ravidá, 2012; Marambe, Vermunt and Boshuizen, 2012). In this process of identifying the categories of existing patterns, there is an inductive view that makes them dependent on the context. In certain contexts, domains or ages, the correspondence between the components is not as the model postulates. This has already been stated by several studies and has been explained in terms that some patterns seem to be of a more universal nature and others more typical of certain territories (Vermunt, Bronkhorst and Martínez-Fernández, 2014; p. 37). It has been mentioned, for example, a "flexible" pattern (Donche and van Petegem, 2009); a pattern combining the reproductive pattern with the undirected pattern (Donche, Coertjens and Van Petegem, 2010) and a pattern called "passive idealist" (Marambe, et al., 2012), among others.

## Distinctive Characteristics of the Model

Vermunt's proposal is undoubtedly very interesting and attractive, so it is worth reviewing its particularities in detail. An initial characteristic of the learning pattern model, is the fact that this theory arises as part of the tradition of SAL studies (Students' Approaches to Learning), originally posited in the works of Marton and Säljo (1976) and in those of Biggs (1993) and Entwistle (1983). In that regard, the model is based on a differential conception in which an interest in characterizing different approaches used by students when facing learning tasks is underlined. In this sense, we assume that each student has his or her own approach to learning tasks that may be more or less convenient, in any sense, or that do not represent any comparative advantage. In the latter sense, we would speak of tendencies maintaining a relative neutrality, a characteristic that has been attributed, among others, to the concept of style (Hederich, 2007).

A second characteristic, which is especially relevant in Vermunt's theory, is that the learning approaches described by the model were not initially conceived for any type of learning, in other words, they do not refer to learning in its general psychological meaning, but only to a certain and very specific type of learning that we could characterize as "educational" learning.

By *educational learning* we refer to that which is intentional and planned within an institutionalized, hierarchical, and progressive educational model, as the one acknowledged in our contemporary societies. This type of learning is assessed and certified by academic authorities; its day-to-day takes place in classrooms specifically arranged for this purpose, at defined schedules, and with a variable number of classmates and teachers; although in a relatively recent way it has been extended to virtual contexts. Most of our educational institutions at all levels correspond in some way to this model.

This characteristic is highlighted by Vermunt himself, when he specifies that learning is "[...] the development of a way of thinking and acting that characterizes the culture of a professional community" (Vermunt, 2005, p. 209). Of course, here the author refers to higher education learning, aimed at the professional development of students in a situated learning context. This point is essential to understanding the learning patterns model. Thus, the proposal may not be appropriate to describing incidental, spontaneous, or day-to-day learning -and does not intend to be so-. In the same sense, the model may not be the most relevant for describing learning objects, such as attitudes or values, for example, basically occurring in informal social situations.

A third characteristic of Vermunt's model is the presence of a differentiated pattern assessment that, in general and within a higher education context, poses different qualities of learning that are more favorable to meaning (MD) and application directed patterns (AD), and less favorable to others, in particular, to the undirected pattern (UD) (Busato et al., 1998; Boyle et al., 2003; Lindblom-Ylänne and Lonka, 1999; Lonka, Lindblom-Ylänne and Maury, 1997; Meyer, 2000; Vermunt, 2005).

Associated to the foregoing, another feature differentiating the conception of learning patterns from learning style is noteworthy; two constructs that, as we have already indicated, belong to the tradition of SAP studies. In contrast to the proven disadvantage of the undirected pattern (UD) against the other three patterns, one of the distinctive characteristics of the concept of (cognitive or learning) style is its neutrality, which makes assigning a more adaptive behavior in all situations to a single stylistic polar end impossible (Hederich, 2013).

One last characteristic of the concept of learning pattern, which has already been highlighted above, is its relative variability. It is precisely this that causes Vermunt to abandon his initial adoption of the term *style* in his model, in favor of the "[...] more neutral, and unstable, learning 'pattern' (Vermunt, 2005, p. 207) term. In the words of Vermunt and Donche "[...] we conceive the learning pattern as a human trait that is not as hard to change, but as the result of personal and contextual influences" (2017, p. 7).[2]

This pattern malleability opens up important pedagogical possibilities in the sense that it allows, at least in theory, to carry out interventions to change an undesirable pattern for a specific type of learning or to develop a specific learning pattern that is appropriate in professional training processes. In fact, references to studies can be found that seek to describe learning patterns intrinsic to professional training careers, such as nursing, engineering, medicine or teacher training (e.g. Lam, To and Chan, 2017; Martínez-Fernández, 2015; Rocha and Ventura, 2011, among others). In this same sense, studies can be found that test curricular structures regarding their ability to educate student populations toward a specific learning pattern considered more appropriate (Morris and Meyer, 2003; Vermetten, Lodewijks and Vermunt, 1999).

Considering the flexibility characteristic of the learning pattern is the basis of a set of longitudinal studies that inquire into the development of patterns along specific curricular sequences (e.g. Donche and van Petegem, 2009; Smith, Saini, Chen, Bosnic-Anticevich and Sainsbury, 2007; Van der Veken, Valcke, De Maeseneer and Derese, 2009).

2 Translations are our own

## The ILS Questionnaire

The path that has so far been proposed to identify learning patterns has been the application of a self-reporting questionnaire originally called ILS (Inventory of Learning Styles) and developed by Vermunt in 1998. The Spanish version of the ILS was developed and validated by Martínez-Fernández (2009), with Spanish and Latin American population samples.

The ILS is composed of a set of statements - 120 in its longest version - that inquire into learning habits, motivations, and opinions related to learning. The instrument is composed of a set of 20 subscales. Table 2 shows the distribution of the ILS questionnaire scales by learning pattern.

**Table 2. ILS learning patterns and subscales**

| Pattern/ Dimension | Meaning Directed (MD) | Application Directed (AD) | Reproduction Directed (RD) | Undirected (UD) |
|---|---|---|---|---|
| Conceptions | Knowledge Construction | Use of Knowledge | Knowledge Intake | Cooperative learning Stimulating education |
| Orientations | Personal interest | Vocation | Certificate Self-test | Ambivalent |
| Regulation | Self-regulation | Self-regulation External regulation | External regulation | Lack of regulation |
| Processing | Critical Processing Establishing relationships and structures | Concrete processing | Memorizing and rehearsing Analysis | |

Source: Prepared based on Vermunt (2005)

Two parts can be differentiated in the instrument. The first one, inquires into processing and regulation strategies; it consists of 55 statements regarding which the student must indicate how often they perform the described activity. The second one, asks about learning conceptions and orientations and it consists of 65 statements regarding which the student must say how much they agree with them. In both parts, there are 5 multiple-choice options ranging from Never, or Totally disagree, until Always or Totally agree.

It should be noted that the 20 scales of the ILS questionnaire are not evenly distributed among the patterns. As shown in table 2, while the MD pattern is defined by 7 scales, the AD pattern only has 3 scales, the UD pattern is defined by 4, and the RD pattern by 6 scales. On the other hand, certain dimensions of the model are represented by the joint values of two "foreign" scales at the same time, as is the case of the self-regulation dimension for the AD pattern, which is defined by combining the values

of the external regulation (of the RD) with those of self-regulation (of the MD). In other cases, the dimension of a pattern is represented *in absentia*, as the dimension of processing strategies for the UD pattern. We will discuss this in detail below.

In general, the ILS questionnaire has shown appropriate levels of validity and reliability in populations with different educational levels and origins (Boyle et al, 2003; Martínez-Fernández and Vermunt, 2015; Van der Veken, Valcke, Muijtjens, De Maeseneer and Derese, 2008).

It should be noted that Martínez-Fernández and their team have developed a series of materials that adjust the model to the field of Primary Education. Thus, they have developed a reduced version of 60 items equitably distributed among the 20 subscales. In addition, they have supplemented the identification of learning patterns with observation categories and interviews in studies that triangulate the information (Martínez-Fernández, García-Orriols, and Galera-Bassachs, 2017). Based on the ILP adjusted to Primary Education, they have presented a reduced proposal of the ILS for higher education students (ILP) and even for the field of learning in organizations (Martínez-Fernández, García-Ravidá and García-Orriols, 2018).

## Model Criticism

We group our model criticisms into three parts. In the first part, we will examine the difficulties related to the undirected pattern. In the second part, we will review the issue of model's generality to non-European population samples, and in the third part, we will discuss the model from a more general perspective, educational in nature.

### Difficulties in the Undirected Pattern (UD)

The undirected pattern (UD) holds a unique place within the learning pattern model, as it groups and describes those characteristics that are less favorable to the school learning situation (Vanthournout et al, 2014). Several studies have corroborated that students with higher scores in this pattern, also exhibit low performances (Smith et al., 2007; Vermunt, 2005), neuroticism (Busato et al., 1998), fear of failure (Busato, Prins, Elshout, and Hamaker, 2000), and dropout (Vanthournout, Coertjens, Gijbels, Donche, and Van Petegem, 2013). The importance of the UD pattern then lies in the possibility of identifying those subjects within an institution exhibiting greater difficulties in reaching their learning achievements because of their particular, very unfavorable, and ineffective approaches to the learning task. In this sense, correctly identifying this pattern is essential to provide an effective pedagogical response to the population exhibiting greater difficulties.

From Vermunt's first approaches to the model, the four characteristics of what we now call the undirected pattern showed significant associations with each other. In 1998, working on samples of 717 students from an open university and of 795 students from a regular university, Vermunt presents the results of a factorial analysis, with Varimax rotation, conducted on the twenty ILS scales. The findings of this analysis show that the scales of "lack of regulation", "ambivalent motivation", "cooperative learning", and "stimulating education" were grouped in the same third factor, both for the sample from the open university students and for those from the regular university. From that moment on, the author calls this grouping of scales as "undirected style" (Vermunt, 1998, p. 166).

One of Vermunt's first characterizations regarding the undirected pattern is the observation that this "style" -at that time he referred to it so- was very similar to what Tait and Entwistle (1996) had previously called an "apathetic approach" (Vermunt, 1998, p.166). This type of approach, also labeled as "non-academic orientation", was used by these authors to identify the associations observed in different previous works between the tendencies of some students to show a disorganized study, "globetrotting" -whose attention goes from one side to another without focusing- and negative attitudes toward it (Entwistle and Ramsden, 1986). In the latest versions of the works in this line, this type of approach was defined by the grouping of two scales of a clearly motivational nature: "lack of interest", and "lack of direction" (Tait and Entwistle, 1996).

In operational terms, the undirected learning pattern is defined and characterized by the association found between the four scales included in the ILS instrument, which we have already mentioned. Two of them correspond to the component of learning beliefs: that of "cooperative learning" and that of "stimulating education"; the third is the component of motivation: that of "ambivalent orientation", and the fourth is a scale of the regulation dimension: that of "lack of regulation".

This definition of undirected pattern hints at two problems in the model. The first has to do with the specification of the pattern within the framework of the general pattern model, and the second one, points to the difficulties in defining and/or operationalizing of some of the scales that comprise it in the ILS. We will discuss each of these problems below.

### *The specification of the UD pattern*

First, it should be noted that, within the description of the UD pattern, there is no precise indication of a characteristic processing modality for this pattern. This is the case, from Vermunt's first developments of the pattern model, in 1998, until the most extensive and complete presentations of the

model, made by the same author in 2005 and 2017. There is no reference whatsoever to any of the processing modalities of the undirected subject except those to its "scarce" processing. What does scarce processing mean?

Some works offer some clues in this regard. According to Vermunt and Donche (2017), students who learn in an undirected way have as an essential characteristic that they do not know very well how to approach their studies. This characteristic, however, better describes their lack of regulation rather than their information processing strategies.

As we have already mentioned, the undirected pattern was linked from its origins with the "apathetic approach" defined by Tait and Enwistle (1996), which indicates lack of interest and of direction. In this line of work, other scales indicating superficial processing types are also associated to learning (Entwistle, McCune and Walker, 2001).

From another point of view, and according to Boyle, et al. (2003), the undirected pattern is characterized by a naïve vision and learning orientations that do not systematically use information processing strategies. From this point of view, it is possible to consider that the distinctive feature of this pattern is not the preferential use of specific processing strategies over others, but rather the non-systematic use of different processing strategies.

Finally, while searching for clarifications about the typical ways of processing the undirected pattern, some authors have noted that these students exhibit problems with study material processing, linked with the quantity of material to be studied and with discriminating between what is and is not important (Busato et al., 1998). This observation is compatible with the idea of superficial processing, which emphasizes rote and recall aspects, which is why the novice is seriously affected by the amount of material to be assimilated. On the other hand, the problem of discriminating between what is important and what is not, could be revealing, in terms of the student, ignorance of the expectations and requirements of the medium, which would entail an nonstrategic approach to learning.

In conclusion, the issue on processing strategies of students who show an undirected pattern seems unclear. It is important, for the model's development, to identify which are the undirected student's typical ways of processing, insofar as the knowledge derived therefrom will allow the design of much more effective educational interventions in modifying the most problematic characteristics of the undirected pattern. As stated above, knowledge about the UD pattern provides valuable additional information to understand the negative aspects of the learning process (Vanthournout et al., 2014).

### *Issues related to the Definition of the Subscales comprising the UD pattern*

A detailed examination of the four subscales that Vermunt builds for the definition of the UD pattern partially explains the association between this pattern and low academic and learning achievement. We perform this analysis below.

Beginning with the subscale of "lack of regulation," indeed, it is intuitively obvious that a student who does not regulate themselves is going to have academic difficulties, insofar as their study behaviors will be erratic. In this regard, there is now sufficient evidence linking self-regulation with high academic achievement and its lack, with failure (Corno, 2001; Hederich-Martínez, López-Vargas and Camargo-Uribe, 2016; Lewis and Litchfield, 2011; López-Vargas, Hederich-Martínez, 2010; López-Vargas, Hederich-Martínez and Camargo-Uribe, 2012).

The second of the subscales that are part of the undirected pattern is referred to by Vermunt as "ambivalent motivation". The definition of this subscale is not always very accurate. In the 1998 article, the author characterizes it as an ILS item: "I am concerned that these studies are too demanding for me. This item may indicate, at the same time, a lack of self-efficacy or a lack of desire to strive for achievement. In the first case, the association with achievement is to be expected, and has been extensively documented in previous works (Bandura, 1977; 1986). In the second case, we would be talking about an apathetic approach, or a state of demotivation, rather than of an "ambivalent" approach.

In his 2005 article, Vermunt clarifies the nature of the ambivalent orientation scale, defining it as "[...] a doubtful and uncertain attitude toward studies, toward their own abilities, toward the chosen academic discipline, the type of education, etc." This same definition is used in his subsequent works (Vermunt, 2005: 214; Vermunt and Donche, 2017). In this definition of the subscale, the author seems to combine a low academic self-efficacy with a doubtful situation by the student regarding their career. These two elements, although of a motivational type, could be considered of a very different nature: the first one expresses doubts toward their own capabilities, while the second one they express them toward the chosen studies. We would understand that a slight positive correlation between these two elements could be expected, but in any case, it would not be very high.

In any case, we could assume that, thanks to the inclusion of self-efficacy, the referred "ambivalent motivation" can effectively be associated to low academic achievement, whether as a predictor or as a consequence of it, as Bandura (1986) has pointed out. In any case, the *ambivalent* name for this subscale could perhaps be unlucky, since it would suggest a two-way (hence ambivalent) orientation, rather than a doubt about one's own capability.

The third of the subscales included in the definition of the UD pattern is the one indicating a learning belief, called "cooperative learning". Once again, we observe some inaccuracies in its definition. In 1998, Vermunt characterized it as an ILS item: "I have the need to work with other students in my studies." In subsequent works, he contributes a more accurate definition: "Assigning a lot of value to learning in cooperation with other classmates and to sharing learning tasks with them" (Vermunt, 2005, p. 214).

There are two issues with the cooperative learning scale. The first is the name of the subscale. Indeed, in the educational field, *cooperative learning* is understood as "[...] the didactic use of small groups in which students work together to maximize their own learning and that of others" (Johnson, Johnson and Holubec, 1994, p. 5). We have known for quite some time that the use of this type o principles, in a systematic and structured way, is associated to a very important increase in learning and, in general, in educational achievement for all students (Johnson and Johnson, 1999). But this use, which is widely accepted in education, is not the use that Vermunt adopts to define his scale. This leads to the first undesirable confusion.

But what is Vermunt's meaning for *cooperative learning*? From our point of view, this author understands it as the *need* a student has to work with other classmates to carry out their studies or tasks. Thus, is indicated by his explicit definition, and it seems to indicate the item he chose to illustrate this scale in the 1998 article. However, an examination of the rest of the items contained in the scale shows another meaning.

Indeed, within the 120 item ILS, the cooperative learning subscale groups eight items, with phrases such as the following:

- I84. "When I prepare for a test, I prefer to do it in a team with other classmates."
- I89. "I like other students to encourage me to process study materials at a given pace."
- I93. "I prefer to do my tasks together with other students."
- I99. "I think it is important to talk to other students to find out if I have sufficiently understood the subject matter."
- I109. "I consider it important to receive advice from other students about how to approach my studies."
- I111. "When I have difficulty understanding some subjects, I prefer to ask other students for help."
- I115. "I consider it important to debate and discuss the topics with other students."
- I120. "In my studies, I need to work as a team with other students."[3]

3 Translation from Martínez-Fernández et al. (2009).

As can be seen, only one of the eight items explicitly mention *need* (I120). The other items mention *preference* (I84, I93, and I111), or *pleasure* (I89). Items 99, 109, and 115 mention a strategic belief ("I think it is important...", "I consider important..."), which in no way excludes other ways of doing it. In fact, we would consider that most of the items contained in this subscale would express a student's preference, pleasure or liking, for working in collaboration with their classmates; not their need to do so. In this sense, the terminological problem we had noted would not be such. This is the second problem we had mentioned: that of its operational definition.

Indeed, and in practical terms, the scale could be indicating the tendency that some students have to work in teams with other classmates, without necessarily expressing a state of need or dependence. In other words, the subscale may be indicating a preference, which has already been described by other authors as a dimension of learning style -cooperative style- (Dunn, Dunn, and Price, 1989; Grasha, 2002).

Put differently, for the undirected pattern to achieve a true and coherent overall solution, it is necessary for the cooperative learning scale, which could be called "teamwork dependence", to effectively express a state of need or dependence on the groupwork situation. If it were the case, it could be explained as a way of compensating the lack of regulation mechanisms, which we have previously analyzed as a constitutive characteristic of this pattern.

The foregoing is consistent with the results obtained by the H. Witkin group on cognitive styles in the field dependence-independence dimension. As it is possible to recall, these authors differentiate a field independent subject, with high restructuring skills and strongly confident in internal referents, from their opposite in the dimension, called "field dependent", the latter with low restructuring skills, plenty of confidence in external referents and high social skills. Witkin posits that the field dependent develops this skill pattern as an adaptive mechanism to compensate for restructuring difficulties (Hederich-Martínez and Camargo-Uribe, 2015; Witkin and Goodenough, 1981). It is possible that it is the same phenomenon.

The last subscales included in the undirected learning pattern is the one that expresses a belief in learning, or a mental model, called "stimulating education". This subscale is illustrated in Vermunt's 1998 article by the item that reads "the course's team should encourage me to compare the theories that are addressed within the course". In 2005, the author explicitly defines this subscale as the belief that "learning activities are seen as students' tasks, but it is the teachers, and the authors of the books, who should stimulate students to carry them out" (Vermunt, 2005, p. 214).

The inclusion of this scale within the learning pattern model as part of the undirected pattern is somewhat confusing, since it seems to exclude the teacher's motivational and affective functions. Actually, this is untrue. What this subscale expresses is the need some students have of being assisted and stimulated by their teachers. In that sense, this subscale seems to express a state of dependence on external regulation, in motivational aspects.

One point to be considered is that, in any case, it seems quite likely that a student's interpretation of the items goes toward the meaning of teachers' being or doing. When a student of education careers, for example, encounters these items, they might consider, with good reason, that the teacher must stimulate their students in the search for knowledge, and especially during initial educational levels. This does not mean that they require it: only that their future role will require it.

It is important to note that the vast majority of studies that have found low learning achievement for undirected pattern subjects have done so by verifying relationships, not with all the subscales comprising this pattern, but specifically with the first two we mentioned: that of lack of regulation and that of ambivalent motivation (Vermunt and Donche, 2017; Vermunt and Vermetten, 2004). This seems to indicate that the undirected pattern may be more appropriately characterized by the first two scales.

The foregoing could be substantiated by the findings of previous studies. Neither in the works of Tait and Entwistle (1996), nor in those that preceded it, are there any references to any association to aspects of cooperative learning and the need for stimulation from the teacher.

On the other hand, Marambe et al. (2012) compared the results of three factor analyses, with Varimax rotation, on ILS subscales obtained in population samples from The Netherlands (N=795), Sri Lanka (N=144), and Indonesia (N=888). In all three samples, a pattern of undirected learning emerged, lacking regulation and ambivalent motivation, but it was only in the Dutch sample that the scales of stimulating education and cooperative learning appeared in that factor. In the Sri Lankan and Indonesian samples, these scales were not part of the undirected pattern. Instead, they were part of a *passive-idealist* pattern, which we will discuss below.

Specifically, on the relevance of including the cooperative learning scale as part of the undirected pattern, there already are several previous outcomes that would support not doing so. One result that has been fairly consistent in the studies, is the fact that women tend to value cooperative learning more than men (Vermunt, 2005). In some publications, cooperative learning has been excluded from the analyses, although the other four scales corresponding to learning conceptions are included (Donche, Coertjens, and Van Petegem, 2010). In other works, cooperation itself seems to have a cultural connotation that makes it desirable and, in that

sense, could be positively associated to achievement (Martínez-Fernández and Vermunt, 2015). We will come back to this last point in the following section.

In summary, despite the fact that the undirected pattern emerges regularly in the analysis of learning patterns, it is possible that it be sufficiently specified, for identification purposes, by the lack of regulation in learning and scarce motivation toward it. The association to preferences toward cooperative learning or toward teacher stimulation may not be intrinsically constitutive of this pattern, but rather depend on cultural and social aspects. In that sense, it might be worthwhile to separately identify a trend toward social learning, which would be independent of the learning patterns and could occur in any of them. This trend will be closer to the idea of a social learning style and would supplement the vision offered by the patterns.

## The Patterns' Cultural Condition

The interest in the influence of cultural aspects on the constitution of learning patterns has been the focus of attention since the proposal emerged. Studies of cross-cultural nature that have tested the universality of the model have focused attention on two matters: 1) the differences between culturally diverse populations versus the scale scores that comprise the model's four dimensions; and 2) the manner how all indicators are grouped together to form similar or divergent learning patterns to those identified for European student populations.

In the first case, research that found differences in the mean scores of some subscales have been the subject of culturalist interpretations of obvious interest. Marambe et al. (2012), for example, argue that the high scores on the ILS memorization and review scale among Chinese students may be due to a high valuation that Chinese culture has of memory as a means to understand content. Thus, the meaning and value of the scale, as conceived in its conception, is lost and associated to aspects related to a more adaptive constructive learning. In the same sense, Marambe interprets the low scores of Indonesian students on the scale of critical thinking by alluding to the fact that the Indonesian educational system endows the teacher figure with a certain reverence that makes any questioning of what the teacher says be negatively valued.

Another illustrative case is given in Latin American student populations. The study by Martínez-Fernández and Vermunt (2015) finds that Mexican, Spanish, Colombian, and Venezuelan students do not establish appreciable differences between the subscales of self-regulation and external regulation. According to the authors, this finding can be understood by the cultural valuation the Latin community attaches to interacting with others and to the importance of negotiation in learning processes. It is

implied here that social interaction requires both external regulation and self-regulation processes, in a much more elaborate process that has been studied in other contexts: that of socially shared regulation, indexed as SSR (Socially Shared Regulation) (Järvelä and Järvenoja, 2011; Järvelä, Järvenoja, Malmberg and Hadwin, 2013).

The second approach to the study of cultural differences in learning patterns has been identifying patterns different from those initially posited by Vermunt. Regarding this point, the authors insist that there are patterns that seem to be universal since they are found in all student populations studied: the meaning directed and reproduction directed patterns, although they are not always configured in the same manner (Vermunt and Donche, 2017).

Also, in studies with non-European student populations, proposals of patterns emerge that, in our opinion, raise doubts. Let us consider, for example, a learning pattern reported by Marambe et al. (2012), comprised of all scales related to learning conceptions and no scale related to processing. This pattern, found in Sri Lankan and Indonesian populations, is labeled as "passive idealist". Another case is that of Vermunt and Donche (2017), who report a pattern that groups all motivational scales, then called "motivational passive". Martínez-Fernández and García-Ravidá (2012), for their part, find a pattern among Spanish students, which we could call "passive" -in general-, since it combines some conception scales and other motivation scales, without incorporating any aspect of processing. Discussions seeking to explain the matter use contextual factors, such as the fact that in some cultures it is not necessary to be coherent between what is said and what is done (Marambe et al. 2012).

Regardless of the explanations given for this phenomenon, the emergence of a pattern only consisting of scales from one of the learning dimensions calls into question not only the sensitivity of the ILS instrument to give meaning to cultural differences, but the model itself, since it destroys the proposal of learning as a coherent whole between stable aspects of conceptions and motivations and more dynamic behaviors of regulatory or procedural strategies.

Is it possible to think of a learning pattern that does not incorporate elements of doing in its description? From Martínez-Fernández's point of view, in personal communication, it could be considered a "postponement" or inactive pattern. From our point of view, this is not a clear learning pattern. If it were, descriptive options would be missing for forms of regulation and processing not considered until then. The solution to the problem found then touches the very foundation of the proposal since, despite its attractive complexity, it does not always reach coherent manifestations.

Another possible explanation for this type of result points to the instrument used to determine the patterns as the key to the problem. Indeed, as stated, the instrument used to determine learning patterns, the ILS, is a self-reporting instrument, in which students must answer, on ordinal scales, their degree of agreement with the statements constituting the items. What could explain, for example, the existence of associations between all scales indicating learning beliefs? Or, in other words, what do the different scales of beliefs, for example, and the items that include them have in common?

One possible answer to this question is in the observation that there are several common elements among the items that comprise the different ILS scales contained in the same dimension.

The first common element among the items of the same component (of the learning model) is their location along the instrument. Indeed, it is possible to observe that the items of all scales indicating learning beliefs are located successively, in the same section of the instrument. Specifically, the items of all the belief scales occupy the last positions of the instrument, from 85 to 120. The items of the different motivation scales occupy, for their part, the entirety of the positions 56 to 79. The items of the regulation and processing scales are mixed together, and occupy the first positions in the instrument, from number 1 to number 55. Could it be considered that the similarities between the questionnaire's answers are influenced by an item position effect? This, in such a long instrument, could not be ruled out.

Another similarity between items of the same component is that they tend to share the same initial phrase. Several belief items, for example, begin with the phrase "For me, learning means [...]". It is possible for students with limited reading comprehension to categorize these items as of the same type, and therefore with the same answer. In short, there are many possibilities to explain these results, and the truth is that it is very important to be able to do so.

## The Contradiction between the Learning Patterns Model and the Educational Model

So far, we have examined some specific elements of the patterns model, specifically the constitutive elements of the undirected pattern, and we have mentioned the model's cultural aspects. In this section, in contrast, we will look at the model from a more general perspective.

We have already mentioned that Vermunt's learning pattern model possesses great qualities, specifically, in the description of learning that takes place in institutionalized educational contexts; particularly in higher education institutions. What is, according to the learning patterns model, the ideal student of the educational system?

In general terms, the ideal student is the meaning directed (MD) student. This implies that they build their own knowledge, which is determined by their own personal interests, and does so in a completely self-regulated manner: the student themselves manages and assesses their process, in relative independence from external information. More than this, this ideal student can work independently on content and learning activities and does not need any kind of stimulation from their teachers. They are not greatly concerned with certificates, or at least not exclusively oriented toward obtaining them. An overview of all the characteristics of the ideal student makes one think of a subject that does not need, nor requires, the different aids provided by an educational system: teachers who assist and encourage and stimulate them, classmates who teach and also learn, demands and requirements to certify achievements.

Thus, we have arrived at a paradoxical situation insofar as the approach to the learning pattern model, while dealing with the description of formal learning achieved in higher education institutions, and based on it, quarrels with the aids and distinctive characteristics of the type of learning proposed by these types of institutions and separates itself from them.

We know that this contrast we are positing, product of our critical review of the model, could be considered somewhat extreme. It is true. We emphasize it to make more visible a point that may be interesting to the observer. Somehow, the learning patterns model opposes the perversions generated by the formal educational system. We know them well: students excessively focused on grades and certificates and not so interested in knowledge or learning. Students who rely on group work so as to not follow the learning tasks on their own and achieve the certifications. Students who assign the responsibility for their learning to the teacher. True. All these cases are clear examples of perversions that our educational system promotes or, at least, finds difficult to prevent.

However, it is also clear that the model has also exaggerated and neglected some of the most distinctive human characteristics of learning, and particularly its social character. Thus, has been posited from social-cognitive theory to social constructivism, underlining the importance of situated learning in learning communities. In the following section, we note some proposals that could help overcome the established criticisms.

## Conclusion: Suggestions for Model Development

The enormous achievements and the great importance of the learning patterns model, defined from the works of Vermunt, justify revising and reformulating some of its elements that, without being structural aspects, introduce some difficulties in describing and explaining the phenomena it addresses.

In this critical review, we have highlighted these difficulties and limitations, with the intention of supporting the development and improvement of a highly interesting and powerful model from the pedagogical point of view. Underpinning its internal and external validity and perfecting the mechanisms for its operational definition will undoubtedly favor its evolution. It is in this spirit that we dare to suggest the following work areas.

It is essential to start a very accurate description of the processing mechanisms of the subjects identified within the undirected pattern and of their relationships with the regulation and non-regulation mechanisms. Only a very good description of these aspects will ensure the design of appropriate pedagogical and stimulation strategies to overcome the limitations exhibited by this pattern in formal learning.

It is also of key importance to clarify the meaning and forms of inclusion of the ambivalent motivation, cooperative learning, and stimulating education scales, included as a structural part of the initial definition of the undirected pattern.

Regarding the cooperative learning scale, it could be renamed in such a way as to highlight the condition of the need to work with other students, rather than their preference or pleasure, and to review the wording of the items that comprise it so that it underlines this condition.

Regarding the stimulating education scale, it is important to change the scale's name and, maybe, give it an emphasis more linked to the responsibility of learning. Very possibly, the original meaning was related to an aspect of attributing responsibility for learning.

It could be interesting to look into integrating the pattern model with some learning style models, especially including a dimension linked to the preference for social learning. People who score high on this dimension may show a preference for explaining to their classmates or undertaking larger and more ambitious projects than those that can be solved independently. On the other hand, these model integrations could significantly enrich the theoretical framework.

To conclude, we are in the presence of a theoretical model that has achieved integrating the major contributions of the models that preceded it in a very powerful way. From our point of view, this road has not ended yet. It is possible to expand it, strengthen it, and give it greater descriptive power. Of course, we would like to be part of this growth process.

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