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# Title: Learning styles terminology: What is the researcher talking about?

**Abstract**
When a researcher encounters the term 'learning styles', its meaning, rather than being explicitly obvious, is dependent on the tradition and therefore the context from which the term has originated. For a new researcher, in particular, it can be a confusing and potentially time consuming process to correctly identify the differences the terminology. Importantly, it has been recognized that different researchers may use the same term, yet may not be referring to the same concept, as is particularly the case with the term 'learning style'. The confusion generated by the use of similar yet unrelated terminologies from different research traditions poses an ongoing important question: should the term 'learning style' be considered as the overall generic term that researchers use to define student learning dimensions? Therefore, the review of terminology in learning style/s related fields could benefit from the acceptance of an overarching terminology, whether it be 'learning styles', 'learning patterns', or 'learning dimensions'. Furthermore, and far more importantly, research related to this terminology could benefit from an extended explanation of the links to other research, making clear, the basis of current and future research to other researchers.

**Keywords**
Terminology, Learning Style, Learning Patterns, Learning Dimensions

# Learning styles terminology: What is the researcher talking about?

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When a researcher encounters the term 'learning styles', its meaning, rather than being explicitly obvious, is dependent on the tradition and therefore the context from which the term has originated. For a new researcher, in particular, it can be a confusing and potentially time consuming process to correctly identify the differences in the terminology. Importantly, it has been recognized that different researchers may use the same term, yet may not be referring to the same concept, as is particularly the case with the term 'learning style'. The confusion generated by the use of similar yet unrelated terminologies from different research traditions poses an ongoing important question: should the term 'learning style' be considered as the overall generic term that researchers use to define student learning dimensions? Therefore, the review of terminology in learning style/s related fields could benefit from the acceptance of an overarching terminology, whether it be 'learning styles', 'learning patterns', or 'learning dimensions'. Furthermore, and far more importantly, research related to this terminology could benefit from an extended explanation of the links to other research, making clear the basis of current and future research to other researchers.

## INTRODUCTION

Surveys and/or inventory tools in the scholarship of teaching and learning research use a range of terminology to describe the items being measured. At times, the exact version of terminology is difficult to discern, particularly when researchers use terms from across a range of conceptual approaches. This essay focusses on the terminology used in studies of student learning in higher education research, with a specific focus on inventory tools, such as the revised study process questionnaire (Biggs, Kember, & Leung, 2001). The essay draws on a range of sources to argue for a standardised overarching terminology to be used across research traditions, as well as, more importantly, to argue for the inclusion, in research papers, of a descriptive paragraph that explains how research relates to current approaches. We approach this from a pragmatic perspective, one in which the relevance of a translation of research to practice, a hallmark of the scholarship of teaching and learning, is paramount. In this context, we take as given, the need for a common terminology, while acknowledging that there may be argument for maintaining the diversity of terminology (Huber & Hutchings, 2005; Hutchings et al., 2011). For the purpose of this paper, we concentrate on a specific concept, the ways in which students learn, focussing on a traditional term, 'learning style'. We also, however, consider the relevance and validity of an alternative terminology, known as 'learning patterns', as defined by Vermunt (1996).

Such a discussion is relevant to the SoTL community, since the importance of an educator understanding how a student learns is fundamental to the success of any scholarship-based teaching. The close relationship between how a teacher teaches and how a student studies and learns, for example, has been long recognized in the teaching and learning scholarly literature (e.g. Trigwell et al., 1999); such insight reinforces the importance of teachers understanding how the student's learning interacts with their teaching. Furthermore, the extensive and long-term work of researchers such as Entwhistle and Ramsden (e.g. Entwhistle & Ramsden, 1982; Entwhistle, 2007) have recorded the complex and multi-facetted nature of the teaching-learning environment, as understood from a long tradition of scholarly investigation into how students learn. While there is a debate regarding the exact details of student learning, including a lively critique of the concepts and models of learning styles and of how students learn (Pashler et al., 2008; Rohrer & Pashler, 2012; Klitmøller, 2015; Willingham et al., 2015), in simple terms, as Darling-Hammond (1998) says in response to a question about what teachers need to know, "The audience is also key: A skilful teacher figures out what students know and believe about a topic and how learners are likely to "hook into" new ideas.". One of the defining characteristics of scholars of teaching and learning is their engagement with their partners in teaching and learning, the students.

While the term 'learning style' has been used widely in the education literature (e.g. Kolb, 1976; Biggs, 1987a; Dunn, Dunn, & Price, 1989; Vermunt, 1994; Fleming & Baume, 2006), it has also been criticized as a confusing term. This confusion is claimed to have arisen out of overlapping definitions and terminology (Peterson, Rayner & Armstrong, 2009). Despite this perception, however, Peterson et al. (2009) noted that, out of the 389 reported 'style researchers' surveyed in their study, 36% would always or often recommend the use of style tests. Peterson et al. concluded that there is "… support for the existence and value of style as a construct and [that] the majority of researchers are keen to see advancement in theory and research in the field" (2009, p. 522).

Learning style is often described in terms of families of learning style (Cofeld, Moseley, Hall, & Ecclestone, 2004). In this context, learning style is considered in terms of modalities. Typical modalities include visual, auditory, kinaesthetic, tactile (collectively known as VAKT) (Fleming & Baume, 2006) and patterns of cognitive ability such as multiple intelligences, personality type (referring to relatively stable personality type: e.g. Myers Briggs Type), learning preferences (e.g. Kolb learning styles theory), and learning approaches (e.g. Biggs, 1987a; Biggs et al., 2001). All of these modalities use the learning style nomenclature either as a full descriptor of the model and inventory tool (or an aspect of it), or in reference to its development (e.g. Biggs, 1987a). Clearly, when it comes to the underlying educational concepts that use learning style terminology, the range of families is diverse. Given that the same term – learning style or styles – is used to label conceptually diverse modalities, it is unsurprising that possible confusion may arise. Furthermore, key researchers such as Biggs et al. (2001) categorically argue that their Study Process

Questionnaire is not a learning style test, insisting, instead, that it is a measure of an individual's approach to learning. This confusion, however, could be a direct result of Biggs using the "learning style" terminology in an early paper (Biggs, 1987a), where it is stated that: "These approaches describe fairly consistent orientations, or learning styles, displayed by students…" (p. 4). It is acknowledged that there is a wide range of styles, theories and learning and study research tools (e.g. Grigorenko & Sternberg 1997; Zhang & Sternberg, 2001; Weinstein et al., 1987; Weinstein & Palmer, 1990) that could also be considered here. However, it is not the purpose of this paper to review all theories around learning style, but to draw attention to the issue of diversity of terminology, and a partial review of the field serves that purpose. Importantly, this study uses models that are cited globally, including, typically, the authors' own country, and uses them to make the point that there is diversity of nomenclature or terminology, a diversity that is only greater the more models that are examined. The general thrust of the article, therefore, stands, regardless of whether every model has been critiqued; the message is that it may behove scholars working within other traditional of the scholarship of teaching and learning to be aware of the terminological implications of the models available to them. We return to our important question: should the term 'learning style' be considered as the overall generic term that researchers use to define student learning? If the answer remains 'yes', then we need to ensure there is a way in which, when a researcher refers to 'learning style' without further information regarding the origin of the term, we can be sure of the tradition or family to which the term belongs and from which it has arisen.

## Why is defining terminology important?

Guidelines and standardisation are ubiquitous in all areas of our lives, from the protocols used for administering cardiopulmonary resuscitation (for example) to educational policy development and practices (Gorur, 2013). A key issue with standardisation, however, is the attempt to encourage conformity, which, some argue, could restrict decision-making by narrowing choice (Gorur, 2013). However, lack of a standard definition is considered by some educational researchers to be a significant concern when considering learning styles terminology (Sanderson, 2011). Sanderson (2011 p.377), for example, notes that, "individual models [of learning styles] can rest on very different definitions of what learning styles are, and whether they are conceived as environmental preferences, cognitive and/or personality traits, or some combination of these, the definition of learning styles has implications for how teachers should respond to their students, suggesting that it does make a difference which model is used".

The origin of theories of learning and teaching, notably, often operate independently from one another. While they may use instruments of similar psychometric principles, they are, in the most part, derived from contrasting theoretical perspectives, and are thus labelled in differing ways (Entwistle & McCune, 2004). Importantly, different researchers may use a particular term, yet may not be referring to the same concept (Sanderson, 2011). It is not uncommon, therefore, when reporting on inventories that attempt to measure aspects of the process of student learning, for terminology to be used interchangeably. Regardless of the confusion that can thus be generated, the term 'learning style' is often used as a common term to describe the range of individual differences in acquiring knowledge (Price, 2004).

The confusion generated by the use of similar yet unrelated terminologies from across different research traditions is exemplified by Cofeld et al. (2004). Cofeld et al. examined thirteen learning style models that contribute to what we know about 'learning style/s', and of what these offer to teachers and learners. The point of interest in their study is that they use the terminology of 'learning style/s' to cover a broad range of 'families' of learning style/s and their related inventory tools. Although it is often accepted that this terminology can be used in different contexts, this can be confusing to researchers unfamiliar with the range of conceptual contexts. Interestingly, Cofeld et al. (2004) sorted learning styles into families, but made no claim as to an optimal overarching terminology to use; in effect they reinforced the diversity of traditions adopting a common term, while maintaining the tradition of a singular term for diverse definitions.

This is not the first time that the term 'learning style' as an overarching term has been questioned. A debate about terminology in the field of student learning is ongoing (i.e. Entwistle, McCune & Walker, 2001; Entwistle & McCune 2004; Gijbels, Donche & Griggs 2014a). From this debate, it is clear that a significant shortcoming of the term 'learning style' is the notion that approaches to learning are deeply rooted in (student) personality and are often associated with stability and un-changeability or are implied to be immutable (Vermunt, 1996; Vermunt, 2005; Peterson et al., 2009). The immutability argument supports Vermunt's (2005) advocacy that a more neutral term – 'learning pattern' – should be used for the phenomenon that researchers generally refer to as 'learning style'. So, while Cofeld et al. (2004) make it clear that there are so called 'families' of learning style/s, thus allowing for the reader to recognise the specific research tradition implicit in or underlying a body of research, Vermunt (1996), makes the case that, for practical purposes, there is need for an overarching term to refer to the broad category of dimensions of learning, regardless of whether they are considered to be fixed or changeable. To this point, research groups such as the European Association for Research on Learning and Instruction (EARLI) further strengthen the case for the use of the term 'learning patterns' to be adopted as the overarching term by advocating the use of this terminology (Gijbels et al., 2014a). This advocacy is based on the "learning patterns model", which they state was originally called "… the "learning styles model" (Vanthournount, Donche, Gijbels, & Van Petegem, 2014, p.14). Additionally, Vanthournout et al. (2014) state that "… to a degree, the learning pattern model builds on the historical heritage form the original studies by Marton and Säljö (1976) and the approaches to learning models (Biggs 1987a; Entwistle and Ramsden, 1982)". Finally it is argued that this model (learning patterns), and therefore the associated terminology, "expands, refines and updates these models [referring to approaches to learning models] in various ways", by including "… additional learning components to the mixture" (p.14).

## Underlying definable theory and contrasting theoretical perspectives

Understanding the theory behind the original development of different frameworks for studying student learning is somewhat complex. For example, in Student Approaches to Learning (SAL) related traditions, a key distinction between research perspectives often lies between two primary approaches: (i) bottom-up models, derived from in-depth qualitative interviews; and (ii) information processing approaches, which draw on psychological theories in cognitive and educational psychology in a top-down manner (Pintrich, 2004; Biggs, 1993a; Dyne, Taylor, & Boulton-Lewis, 1994). However, it should also be noted that researchers do not necessarily align to a particular perspective. For example, Biggs et al. (2001), in the development of a revised study process questionnaire (R-SPQ-2F), drew on both the original Study Process Questionnaire (Biggs, 1987a) – a bottom-up approach – and the ten-point scale Study Behaviour Questionnaire, which was conceived within a top-down information-processing context, but itself revised within the bottom-up model of the SAL conceptual framework in the final iteration of the questionnaire (Biggs et al., 2001). To this point, it would appear to be important, when reporting on learning styles, to define the underlying theory or theoretical context, so that contrasting underlying perspectives from each tradition do not become confused, but rather inform the reader.

Having noted the pragmatic convergence of unrelated conceptual bases, it is important, however, to also note that the origin of learning style theories of learning and theories of teaching often operate independently from each other, with instruments of similar psychometric principles in the most part derived from contrasting theoretical perspectives (e.g. Table 1), and thus labelled in differing ways (Entwistle & McCune, 2004). Table 1, for example, presents a summary of inventory tools for studying learning approaches and identifies deep/surface approaches. Only the SPQ and ASI covers the three main scales considered, other inventories listed cover additional dimensions of learning. All the inventory tools considered in Table 1, are based around a set of questions developed and tested independently by difference research groups or individuals as a means to measure at least two or three subscales. All these models attempt to measure factors that have been identified in previous research, which are tested using factor loadings to determine suitability in the various inventories (Entwistle, 2013). The table also illustrates, as Entwhistle (2013) puts it, that "certainly the distinction between deep and surface processes can be considered to be firmly established as a useful way of describing approaches to studying" (p.102).

The similarity of terminology, and thus its interchangeable use, has resulted in scrutiny of the apparent inconsistency and ambiguity related to deep and surface processing terminology (Dinsmore & Alexander, 2012). In this regard, Dinsmore and Alexander's (2012) review of over 200 studies found that making comparisons across studies and contexts was difficult due to differing conceptualizations of deep and shallow processing. Importantly, they stated that, "if the definitions are not well specified, the measures of the construct and resulting interpretations are questionable" (p. 520). Dinsmore and Alexander also demonstrated that definitions, measures and interpretations differed greatly between studies, and that identifying the precision and explicitness of definition and description was a major issue in terms of the coding process used in their study. Although they make the point that inconsistencies may be attributable to lack of conceptual clarity, one particular learning style family is considered at a time, making inconsistencies appear to be less of an issue. This, again, supports the case for the development of a means to easily differentiate terminology across research traditions and to promote the explanation of the links. This may be achieved easily, in, for example, a simple reportable paragraph in research papers that makes the conceptual basis of research clear to other researchers.

**Table 1: Comparison of main scales of exemplary inventories, measuring study dimensions (adapted from Entwistle & McCune, 2004).**

| Inventory Tool | Deep/ meaning scale | Surface/ reproducing scale | Achieving approach/ orientation |
|---|---|---|---|
| **Study Process Questionnaire (SPQ) (Biggs, 1987a)** | Deep approach Refers to motives of intrinsic interest, and to strategy of maximizing meaning (Biggs et al. 2001) | Surface approach Refers to motives of fear of failure, and to strategy of narrow target, rote learning (Biggs et al. 2001) | Achieving approach Refers to motives of achievement, and to strategy of effective use of space and time (Biggs et al. 2001) |
| **Approaches to Studying Inventory (ASI) (Entwistle and Ramsden, 1982)** | Meaning orientation Refers to relating ideas, comprehension learning, use of evidence (Entwistle & McCune, 2004) | Reproducing orientation Refers to syllabus boundness, operation learning, extrinsic motivation, fear of failure (Entwistle & McCune, 2004) | Achieving orientation – Refers to disorganised studying, a strategic approach, and achievement motivation (Entwistle & McCune, 2004) |
| **Inventory of Learning Styles (ILS) Vermunt (Revised version 1998)** | Meaning directed Relating and structuring, critical processing, concrete processing, personally interested orientation, self-regulation, construction of knowledge model (Entwistle & McCune, 2004) | Reproduction directed Relating to memorising and rehearsal, analysing, certificate oriented, self-test oriented, external regulation, intake of knowledge model (Entwistle & McCune, 2004) | Not Applicable (Other dimensions measured) |
| **Approaches to Learning and Studying Inventory (ALSI) (See Entwistle & McCune, 2004)** | Deep approach Refers to ones intention to understand, relating ideas use of evidence, monitoring studying (Entwistle & McCune, 2004) | Surface approach Memorising without understanding, unthinking acceptance, fragmented knowledge (Entwistle & McCune, 2004) | Not Applicable (Other dimensions measured). |

A further important finding in Dinsmore and Alexander's (2012) study is the recognition that deep and surface processing learning style scales in inventory tools are dependent on four key contextual parameters: (i) the who, i.e. the characteristics of the learner; (ii) the where, i.e. where the processing is taking place or the context;

(iii) the when, i.e. when the processing occurs, the temporal aspect; and (iv) the what, i.e. the target of learning. They also conclude that, "future meta-analysis of deep and surface processing [should be] conducted under these more precise conceptualizations" (p. 522). Furthermore, they state that, "contextual considerations could be an important factor in challenging the assumption that deep processing is always good and surface processing is always bad" (p.502). If researchers need to align results arising out of different traditions, using these conceptualisations it may provide a means to identify parallels, similarities and differences between diverse studies.

## Learning patterns terminology

Depending on a researcher's previous academic training, conceptualizations tend to lead to a choice of terminology, which, when reinforced by their continuing research and publication, become difficult to change or add dimensions to (Entwistle & McCune, 2004). Importantly, researchers such as Entwistle (2004) have previously recognised the need for some compromise between both competing descriptions and theoretical positions, promoting the idea of providing "empirical evidence of what are the main dimensions through which to describe student learning and studying" (p. 339). This compromise between competing descriptions is best illustrated by Gijbels et al. (2014a), where they deliberately adopt a generic definition, 'learning patterns', so that a wide range of theoretical perspectives regarding student learning can be discussed. In this context, the term is used to encompass both recent and historical evidence regarding the cognitive processing, and the consideration of metacognitive, motivational and effective strategies that students are known to use (Gijbels et al., 2014b). Furthermore, Gijbels et al. (2014b), specifically mention different research traditions that they use in their attempts to produce an integrative model of learning. Making initial mention of the large variety of studies carried out in a variety of areas such as cognition in learning, learning styles, intellectual styles, learning concepts, approaches to learning, self-regulation, meta-cognition, and motivational aspects of learning, by looking at learning dimensions very broadly, making comparisons, and clearly stating the need for an overarching terminology. Gijbels et al. (2014b) make a sound argument for 'learning patterns' as an overaching terminology. Another option for defining the vast range of learning dimensions, other than learning styles or learning patterns, could be the use of the term 'learning dimensions'. The use of this term appears to be perfectly suited to discussions about student learning styles, patterns, approaches, or dimensions, because it is not based on any one particular model. The term is also used as a descriptor periodically through Gijbels et al. (2014a): "'Dimensions of Learning Patterns', provide theoretical perspectives aiming to broaden, deepen and integrate the present knowledge based on ***dimensions*** and patterns of student learning" (p. 2).

Importantly, while 'learning styles' are often erroneously thought of in reference to fixed characteristics only (Vermunt, 1996), the term 'learning patterns' is based on an expanded model of 'learning styles' which includes more dimensions (Gijbels et al. 2014a). The very use of the term 'dimensions' in this context is conducive to the expansion of ideas and concepts related to learning, and allows for the expansion of areas of which researchers may not have considered using a terminology which is not necessarily connected to a particular research tradition. While this may seem a somewhat pragmatic point of view, clearly all three terms ('learning style', 'learning patterns', and 'learning dimensions') are suitable and relevant terminologies, as long as they are defined clearly in research papers.

## A model for reporting

This review of issues of terminology in learning style/s related fields indicates that higher education inventory tools could benefit from the acceptance of an overarching terminology, whether it be 'learning styles', 'learning patterns', or 'learning dimensions'. Furthermore, and far more importantly, research related to learning dimensions could benefit from an extended explanation of the links to other research, and to promote the use of an easily reportable paragraph in research papers on student learning and inventory tools that makes the basis of current and future research clear to other researchers. Therefore, we propose a model for reporting of terminology as identified in Figure 1.

Furthermore, we also propose that the changeability of the target learning dimension (previously learning styles), or lack of, if known, should be reported, clearly defining traditions that look at characteristic of a learner that are considered fixed (e.g. Kolb Learning styles) or changeable (e.g. Biggs Learning approaches). Additionally, we believe the reporting of the nature of the inventories development (i.e. top-down or bottom-up model or other models) and defining the research tradition to which a study draws its research from, could help readers to easily identify if a research paper is relevant to them or to allow a new researcher the opportunity to look back to other relevant literature. Given that a researcher's previous academic training, conceptualizations tend to lead to a choice of terminology (Entwistle & McCune, 2004), this would allow academics from other fields to understand the context of research more quickly. Importantly, this also provides researchers, as Entwistle (2004) indicates, the opportunity to compromise between competing descriptions and theoretical positions. This approach would also help alleviate the criticisms raised by Peterson et al., (2009), regarding the problematic use of overlapping definitions and terminology.

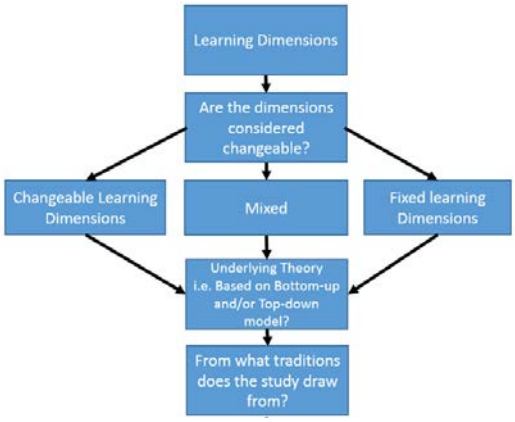


**Figure 1: A Learning Dimensions model for reporting student learning in higher education inventory tools.**

To summarise:

- The changeability of target learning dimensions helps to clearly define the tradition.
- The theoretical basis of the tool (i.e. top-down or bottom-up model or other models) could further reduces confusion over the research tradition on which it is based.
- The author should not assume that the reader will know the linage of tradition that the learning dimension originates and should clearly reference the linage of the original research.

As an example, a researcher could simply state that: This research is based on learning dimensions that are often considered changeable, drawing on the Student Approaches to Learning (SAL) framework and Approach to learning traditions that is based on a mixture of bottom-up and later, top-down models. The linage of the learning dimension tool used in this study is based on a linage of research by Biggs (1970, 1976, 1978, 1979, 1985, 1987a, 1987b, 1987c, 1991, 1993a, 1993b, 1999) where he developed and tested the tool, culminating in the latest revision, the revised two factor Study Process Questionnaire (R-2F-SPQ) (Biggs et al., 2001).

## CONCLUSION

How can we as researchers refer to different learning style traditions without confusing readers? We suggest that in all research articles that the author should, if possible, refer to an overarching term such as learning patterns or learning dimensions as suggested in this paper, and most importantly specify the model used if based on existing models, as well as the tradition to which the research has been most based. We believe that it should be explicitly stated so that the reader can see from where the terminology has taken its context, thus promoting investigation into the field by other researchers or a better understanding for researchers from similar fields. Furthermore, if the researcher is so inclined, we suggest that perhaps defining the precise linage of the research leading up to the final iteration of whatever inventory tool is used in a study.

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