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# Measuring on-the-job learning styles: a critique of three widely used questionnaires

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## Abstract

More insight into on-the-job learning styles has great theoretical and practical importance. Knowledge about their own and other possible on-the-job learning styles will offer employees opportunities to improve their choices in learning behaviour, it will improve communication and collaboration between team members, and offer opportunities to receive specific guidance by human resource professionals or managers.

Many researchers and human resource professionals are well aware of these advantages and use various instruments to measure on-the-job learning styles. Furthermore, a large number of studies about on-the-job learning have learning styles as a significant aspect of their investigations. However, in our view, the measurements used are not well suited for their purpose. The problem is that only a few psychometrically validated instruments are available. However, most of these are not specifically geared to work situations. As a result, many people use various questionnaires that measure learning styles in formal learning situations only. For example, Kolb's Learning Style Inventory (1976, 1985), Honey and Mumford's Learning Style Questionnaire (1986, 1989), and Allinson and Hayes' Cognitive Style Index (1996) are widely used to measure on-the-job learning styles.

These questionnaires have been strongly criticised, in particular when used to measure learning styles *on the job*. Even though some of the learning styles measured by these instruments are also found in work contexts, supplements and adaptations are needed to use these instruments adequately in on-the-job learning situations.

Consequently, there is a pressing need for new, well examined, and validated instruments for measuring on-the-job learning styles, since the existing instruments do not fill this need. Three major recommendations can be made to accomplish this. Standardised items should be used in several specific work-based learning contexts. Furthermore, caution should be exercised in using the term 'learning' in the items, since this term does *not* make people think about *on-the-job* learning. Finally, the instrument should measure not only the dominant characteristics of someone's learning style, but also the broadness of the learning repertoire, that is, a person's flexibility in using learning strategies.

### Increasing importance of on-the-job learning

The increasing rate of change in the world of work suggests that learning in work contexts is becoming important for the organisation as well as for the individual co-workers in the organisation (e.g. Furnham, Jackson, & Miller, 1999). For organisations it is important to learn because of the unpredictability and speed of change in the world of work, the increasing complexity of the knowledge and information society, the efficient use of the organisation's human resources, and their strategic importance on the labour market (Bolhuis & Simons, 1999). For organisations it is important that employees learn to be able to remain profitable and customer oriented. Organisations are no longer able to guarantee job security or long term career opportunities, which makes it important for employees to be employable in other organisations. They need experience and training to enhance their market skills in the insecure labour world.

Since the world of work is changing constantly, the driving force for learning should be the learning process (learning how to learn), rather than performance (learning technical skills). Employees need to learn to identify skill gaps and anticipate how changes elsewhere in the firm or industry may affect work demands and skill requirements. Organisations can provide resources that enable individual learning. Structured development plans, however, are often costly and impractical (London & Smither, 1999). Therefore, employees' self directed on-the-job learning is very important. In order to encourage employees' self directed on-the-job learning, organisations should provide an atmosphere that involves three essential elements: the availability of behavioural choices, the knowledge that others understand the employee's perspectives, and informational - not threatening - feedback (Deci, Connell, & Ryan, 1989).

### Relevance of on-the-job learning styles

A convenient way to create the atmosphere to improve self directed on-the-job learning is making employees aware of their learning styles in work related activities (their on-the-job learning styles). On-the-job learning style can be defined as the tendency to use a certain combination of implicit and explicit learning activities that a person can and likes to perform on the job. The person may use a different combination of learning activities in each different situation. This particular combination is called the actualised learning strategy.

Knowledge about their own and other possible learning styles will make employees aware of their choices in learning behaviour, offering them opportunities to improve their current strengths while challenging them to improve their abilities in weaker areas and

helping them to choose realistic goals. Furthermore, knowledge about individuals' on-the-job learning styles can improve communication and collaboration between team members. Colleagues can compare on-the-job learning styles, helping them to better understand their learning perspectives. When two people approach a problem from opposite angles, they will both suggest different solutions. This can be irritating to them, but better understandable if they know that they both have different learning styles (Briggs Myers, 1962). Colleagues with different on-the-job learning styles can complement each other in finding the best solution. Knowledge about each other's learning styles enables team members to understand how the team can function effectively and where the team may need outside assistance. Employees are inclined to collaborate with people who have similar on-the-job learning styles (Martin & Halstead, 2001). Since people collaborating with people who have other on-the-job learning styles can complement each other in their work, managers and human resource professionals should stimulate collaboration between employees with different on-the-job learning styles. Furthermore, the human resource professional or manager can offer employees optimal guidance, that is, guidance most suitable to their individual on-the-job learning style, giving informational rather than threatening feedback.

#### Problems involved in measuring on-the-job learning styles

In educational psychology, learning styles of students and pupils in schools have been the subject of investigation. Many instruments for measuring learning styles have been developed. Many researchers and human resource professionals are well aware that measuring on-the-job learning styles has many advantages for employees, teams, and organisations. So far, however, little research has been conducted about on-the-job learning styles of workers in organisations. Nevertheless, researchers and practitioners use various instruments to measure on-the-job learning styles. Many articles about on-the-job learning use learning styles as a significant aspect of their investigations (e.g. Furnham et al., 1999; Jackson, 2002). However, the construct learning style is not well established for *on-the-job* learning situations, so far.

The problem is that only a few psychometrically validated instruments are available. Most of the existing instruments are not statistically validated or worse, these instruments are known to be invalid and unreliable (Snyder, 1998). The psychometrically validated instruments available are not specifically geared to work situations. As a result, many people use different questionnaires in the work context, which measure learning styles in vocational and professional educational contexts. These instruments are not automatically suitable, however, for workplace learning contexts. Even though some of the learning styles

distinguished can also be found in work contexts, the same person may have different styles in different learning contexts. Furthermore, the items in the questionnaire cannot always be applied to on-the-job learning situations. Supplements and adaptations are needed for several reasons. For example, there are differences in the regulation of learning processes, because students and workers have different goals and motivations. The status of learning is different. In schools learning is the first priority and at the workplace learning is *not* usually the first priority. From personal contacts with researchers of large organisations can be derived that they have conducted some corporate research in work contexts, but usually the results are not publicly available for commercial reasons.

Another problem is that most existing instruments concern individual, psychological factors only. However, it should be recognised that learning, and especially on-the-job learning, is a social process. Knowledge and skills have a social life: they originate in and can be distributed only through social interactions (Brown & Digid, 2000). This suggests that social-interactive factors should be included, such as the dependency on other people (colleagues, manager or human resource professional) and the inclination to collaborate with them.

One more general problem is that the majority of researchers and practitioners in the area of learning styles in on-the-job settings, like most educational scientists, use methods that ignore the influence of the specific learning situation. This might be due to the lack of a learning theory, leaving aside the relationship between learning style, the specific learning situation, and characteristics of learners, such as experience and motivation (Bakker, 1985). People use different learning strategies in different learning situations. Again, this shows the importance of employees' awareness of their own on-the-job learning styles. Even if their learning style usually functions properly, in some situations it will not fit. If they can be made aware of their habitual combination of learning strategies (their on-the-job learning styles), and other possible learning strategies, they will be able to recognise these situations and adapt their attitude and behaviour. For example, in some situations nurses **should best** assimilate and in other situations they **should best** innovate. If they have problems with a specific drip system, they should assimilate to this system in a situation where they quickly need to use this system on a patient. If they are in a discussion of progress with their colleagues, they should try to innovate their working with this drip system, for instance by rewriting the system's protocol, to prevent problems in future occasions.

Employees are more able to adapt their attitude and behaviour to different learning situations if they have a broad repertoire of learning strategies and if they are flexible in using

these strategies (Kolb, 1984). Ertmer and Newby (1996) and Weinstein and Van Mater Stone (1996) call people expert learners to the extent that they have a broad repertoire of learning strategies, combined with meta-cognitive knowledge about when and how to use these strategies and the flexibility to change their strategy whenever necessary.

In most questionnaires people are asked directly about learning. Doornbos and Simons (2001) developed a better approach to investigating learning processes in on-the-job learning situations. People should be asked indirectly about their learning process, by asking them about work situations. The word 'learning' conveys the wrong message. Employees start thinking about courses they attended, books they read, coaching they received and so on. Only when the word 'learning' was not used and instead the respondents were asked about changes in competences, started people to realise that they had learned a lot in and from their work. By focussing on concrete changes in work processes or outcomes, they became aware of their learning processes. When they realised *what* they had learned they started to talk about *how* they had learned.

In summary, the few psychometrically validated instruments used to measure on-the-job learning styles are mostly geared to measuring learning styles in other contexts and cannot automatically be applied to on-the-job contexts. Most instruments only concern individual psychological factors and do not involve the social process, which is very important in on-the-job contexts. Furthermore, they ignore the influence of specific learning situations and do not measure a significant aspect of on-the-job learning styles, that is, the broadness of the employees' repertoire of learning strategies. In many questionnaires used, people are asked directly about their learning styles, but people should be asked indirectly about their on-the-job learning process.

In order to elaborate on the general comments made so far, the next section will describe three of the most famous self-report instruments that are widely used for measuring on-the-job learning styles: Kolb's Learning Style Inventory (1976, 1985), Honey and Mumford's Learning Style Questionnaire (1986, 1989), and Allinson and Hayes' Cognitive Style Index (1996). What will be examined in particular is to what extent these instruments can be used in on-the-job learning situations.

## Three widely used questionnaires

### Kolb's Learning Style Inventory

Kolb is one of the few researchers of learning styles who relies on a learning theory: the experiential learning theory (Kolb, 1984). In this theory he acknowledges the complex relationship between situational factors and the origin, development and alteration of learning styles. He describes the different forces that shape learning styles, which are, in chronological order: psychological type, educational specialisation, professional career, current job, and adaptive competencies.

Kolb conceptualises experiential learning as a cyclical process. This cyclical process involves four distinct learning stages in sequence: concrete experience, observation and reflection, the formation of abstract concepts and generalisations, and active experimentation by testing hypotheses, leading to new concrete experience, and so forth in a new cycle. Kolb defines these stages as concrete experience, reflective observation, abstract conceptualisation and active experimentation.

Although people possess and use all four learning stages, there are differences between individuals in preference patterns or strengths and weaknesses. They start at different stages and tend to emphasise different stages of the learning cycle. These differences are mainly based on the distinction in preference for abstract versus concrete learning and active versus reflective learning. People can be characterised in terms of four basic learning styles: the converger, diverger, assimilator, and accommodator styles.

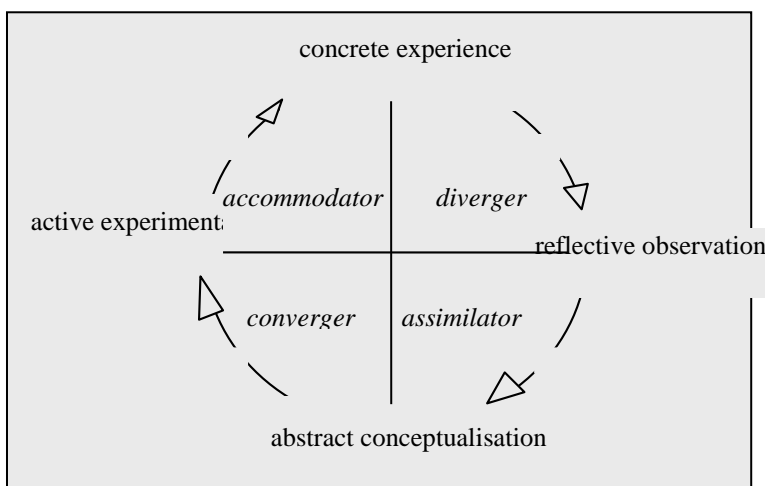


Figure 1. Diagram of learning styles (Kolb, 1984).

The convergent learning style depends mainly on the dominant learning capacities of active experimentation and abstract conceptualisation. The converger's greatest strength is in the practical application of ideas. Convergers tend to be relatively unemotional and prefer to deal with things rather than people. The divergent learning style has the opposite learning advantages over the convergent learning style. Divergers depend mainly on concrete experience and reflective observation. Their strengths lie in an imaginative ability. They tend to be interested in people and emotional elements. The assimilative learning style depends mainly on abstract conceptualisation and reflective observation. Assimilators' tend to be less interested in people and less concerned with practical applications of knowledge, more often concerning with abstract concepts. Their strengths lie in their ability to create theoretical models. The accommodative learning style has the opposite learning advantages over the assimilative learning style. Accommodators depend mainly on active experimentation and concrete experience. Their strengths lie in doing things and involving themselves in new experiences. They adapt easily to specific immediate circumstances, solving problems intuitively, while relying on others for information.

The Learning Styles Inventory (LSI) (Kolb, 1976) consists of nine items of four single words that should be ranked according to how the respondents feel the words best describe their learning style. Although this inventory is widely adopted by researchers and practitioners, it has often been criticised for an apparent lack of reliability, temporal stability, and construct validity (see Allinson & Hayes, 1990; Sadler-Smith, 1997). Kolb developed a revised version of his inventory to overcome these weaknesses, the LSI2 (Kolb, 1985). But this inventory, which contains twelve items with four alternatives for each item, seems to bring about little improvement (Allinson & Hayes, 1990). Researchers report mixed results in measuring reliability (see e.g. De Chiantis & Kirton, 1996; Willcoxson & Prosser, 1996). Atkinson (1988) reported that this revised version of the LSI is less stable than the original measure. Several studies show high face validity of the LSI2 (see Hermanussen, Wierstra, De Jong, & Thijssen, 2000). Construct validity has hardly been investigated. The little research conducted, however, shows poor construct validity. The underlying factor structure is not as clear as predicted (e.g. Loo, 1996; Newstead, 1992).

The items used in both tests are short and multi-interpretable. Respondents are not instructed to think of a given context when filling out the questionnaire (Willcoxson & Prosser, 1996) and thus, the influence of the specific learning situation is ignored. Kolb approaches learning as an individual process. He does not involve social aspects of learning in his study and the relationship between thinking (or working) and learning is unclear. In both



versions of the LSI people are directly asked about learning, which is not the best way to ask people about learning in work situations. Furthermore, the LSI only measures which stage in the learning process people emphasise; it does not measure broadness in repertoire of learning strategies.

Honey and Mumford have developed a new instrument to be used as a more reliable alternative to Kolb's theory and instrument to identify learning styles that are meaningful to the managerial population (Allinson & Hayes, 1988; De Chiantis & Kirton, 1996). They made a slight modification to Kolb's terminology.

### Honey & Mumford's Learning Style Questionnaire

Honey and Mumford (1986, 1989) developed their own view on the learning cycle, inspired by Kolb. Each step in this cycle represents a different learning strategy. In following this cycle, people repeat strategies and tactics that were found to be successful and discontinue strategies and tactics that were not. In this way preferences for certain strategies become habitual and as a result learning styles develop. In this way, the different stages in Honey & Mumford's learning cycle can also be seen as learning styles. The learning cycle can be positioned around the following learning styles: the activist, reflector, theorist and pragmatist styles.

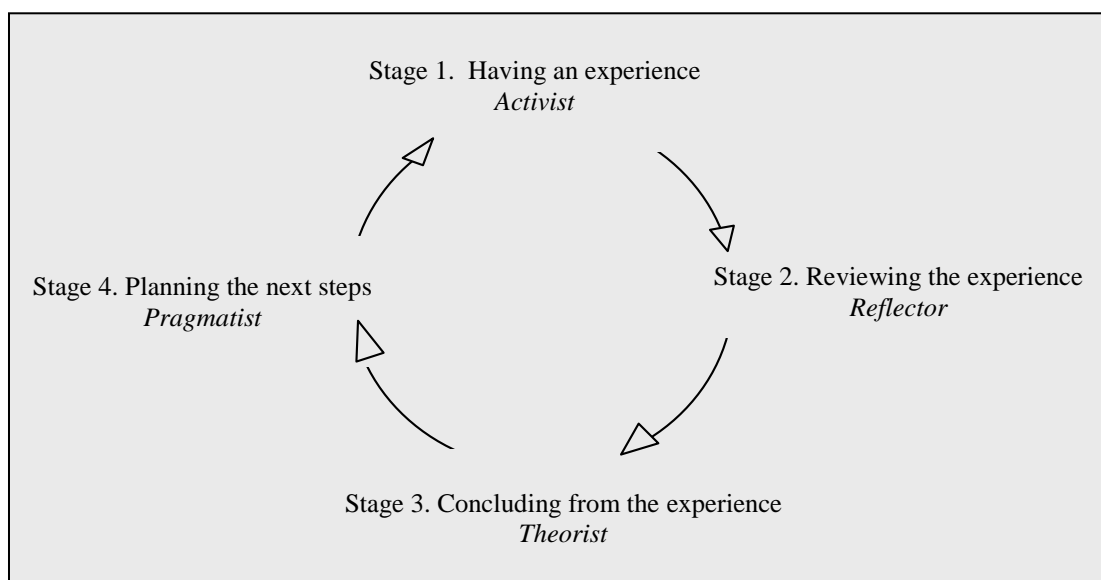


Figure 2. The learning styles positioned around the learning cycle (Honey & Mumford, 1989).

Activists like doing and experiencing things. They involve themselves fully and without bias in new experiences, acting first and considering the consequences later. Reflectors are cautious. They like to stand back to ponder and observe experiences from many different perspectives, considering all possible angles and implications before making a move. Theorists are rational and logical. They like to integrate observations into a conceptual framework, relying on rationality and logic to achieve a synthesis and to understand underlying reasons, concepts and relationships. Pragmatists, finally, are essentially practical. They try out ideas, theories and techniques to see if these work in practice, using them as a basis for decision-making and problem solving.

The Learning Styles Questionnaire (LSQ) is based on this learning cycle. It consists of 80 items, with only two alternatives per item, agree and not agree. The questions are focussed on observable behaviour rather than the psychological basis for that behaviour, as in Kolb's LSI. The LSQ has a better reliability and better face validity than the LSI (Allinson & Hayes, 1988). Construct validity has hardly been investigated (Swales & Senior, 1999). Conducted research shows mixed results in factor analyses [compare Allinson & Hayes (1988, 1990), Swales & Senior (1999) and Marshall & Merritt (1986)].

Like in Kolb's LSI the specific learning situation is ignored the questionnaire does not involve social aspects of learning and broadness in repertoire of learning strategies. The respondents are asked more indirectly about learning than in the LSI.

Another, more cognitive, widely used questionnaire to measure styles in work situations is Allinson and Hayes' Cognitive Style Index.

#### Allinson and Hayes' Cognitive Style Index

In psychological literature a considerable array of dimensions on cognitive style<sup>1</sup> have been differentiated. Many researchers share the idea that these various dimensions can be

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<sup>1</sup> The terms cognitive style and learning style are often used for the same concept. Cognitive styles represent individual differences in how a person perceives, thinks, solves problems, and learns (Witkin, Moore, Goodenough, & Cox, 1977).

reduced to two qualitatively different types of thinking and suggest a connection with the two halves of the human brain (e.g. Entwistle, 1981; Sperry, 1977). Allinson & Hayes (1996) use the terms 'intuition' and 'analysis' to describe right-brain and left-brain thinking.

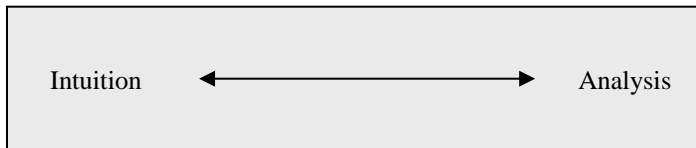


Figure 3. Allinson & Hayes' Cognitive styles.

Analytic individuals prefer structured approaches to decision-making. They are especially comfortable when handling problems requiring a step-by-step solution. The thinking of intuitive individuals, on the other hand, relies on impulsive synthesis and lateral reasoning. Intuitives prefer rapid, open-ended approaches to decision-making.

Allinson and Hayes (1996) introduced the Cognitive Style Index (CSI) as a measure of intuition and analysis for organisational research. The CSI is mostly used to measure cognitive styles of employees in training programs and vocational and professional education. The inventory contains 38 items scored on a three-point scale of true – uncertain – false.

Psychometric studies show good evidence of reliability and construct validity of the CSI (e.g. Allinson & Hayes, 1996; Murphy, Kelleher, Doucette, & Young, 1998; Sadler-Smith, Spicer, & Tsang, 2000).

The CSI seems to be appropriate to be applied in on-the-job learning situations. However, the instrument does only concern individual psychological factors and does not involve the social process, ignores the influence of specific learning situation and does not measure the broadness of the employees' repertoire of learning strategies. It does not even distinguish the different learning (or thinking) strategies the instrument intends to cover. The style 'intuition' contains concepts such as synthetic, inductive, expansive, unconstrained, divergent, informal, diffuse and creative. The style 'analysis' contains concepts such as analytic, deductive, rigorous, constrained, convergent, formal and critical [Allinson, 1996 #66].

### Conclusion

iets over adaptive style inventory kolb Noemen bij situatieargument, ook zeggen dat het nog niet veel toegepast wordt.

The learning style questionnaires described in this paper have been strongly criticised, certainly if they are used to measure learning styles *on the job*. Even though some of the learning styles measured by these instruments are also found in work contexts, supplements and adaptations are needed to use these instruments in on-the-job learning situations.

Consequently, there is a pressing need for new, well examined, and validated instruments for measuring on-the-job learning styles, since the existing instruments do not fill this need. On the basis of the criticism on the existing questionnaires described in this paper three major recommendations can be made to accomplish this. Standardised items should be used in various specific work-based learning contexts. Furthermore, caution should be exercised in using the term 'learning' in the items, since this term does *not* make people think about *on-the-job* learning. Finally, the instrument should measure not only the dominant characteristics of someone's learning style, but also the broadness of the learning repertoire, that is, a person's flexibility in using learning strategies.

A new, well examined, and validated instrument intended to measure on-the-job learning styles should be developed, taking these three recommendations into account. This will offer researchers, human resource professionals, managers, and employees an opportunity to understand the ways in which employees develop knowledge and skills and, thus, offer opportunities for more effective on-the-job learning.

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