

Relating variance in feedback effectiveness to learning styles

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Abstract

Introduction: Students consider feedback to be an important aspect of good teaching, and meta-analyses confirm its influence on academic achievement. Anecdotal observations in pharmacy practice workshops at our institution suggested variance in students' perceptions regarding the effectiveness of feedback.

Aim: To explore reasons students perceive the effectiveness of feedback differently from each other.

Methodology: As a conceptual paper, this article does not conform to the standard format of empirical research papers. Instead, it develops an argument by drawing on two established theories about the learning process, Vygotsky's theory of Social Constructivism and Learning Style theory.

Results: The effectiveness of feedback may be influenced by factors other than quality. We propose an original model that links feedback preferences with learning styles, and make recommendations to pharmacy educators grounded in research findings.

Conclusion: The Matched-Mismatched Feedback Model may account for some of the variation in feedback effectiveness. Further empirical research to explore the validity of our model is recommended.

Keywords: *Feedback, Learning Styles, Feedback Effectiveness, Conceptual Model*

Introduction

An enduring issue facing pharmacy academics is how best to design and deliver curricula so that students can learn most effectively. Although educationalists use a variety of approaches to develop the knowledge and skills of learners, not all methods are equally effective. Students perceive feedback to be one of the most important "facets of good teaching" (Ramsden, 2003: p.99), and several meta-analyses confirm it is among the top ten influences on academic achievement (Hattie, 2009). Feedback is "conceptualised as information provided by an agent (e.g., teacher, peer, book, parent, self/experience) regarding aspects of one's performance or understanding" (Hattie & Timperley, 2007: p.81).

Because of the central role feedback was understood to play in learning, pharmacy practice (dispensing and counselling) workshops at our institution were designed to facilitate verbal feedback exchanges between tutors and students. The current paper arose as a result of anecdotal observations in these workshops; while some students appeared to engage readily in the exchanges, others did not, resulting in variance in the effectiveness of the feedback. Although research on student perceptions of feedback "remains thin" (Poulos & Mahony, 2008: p. 144), a number studies conducted in the past two decades

have attempted to identify what constitutes effective feedback (Paich & Sterman, 1993; Wojtas, 1998; Higgins, 2002; Carless, 2006; Ferguson, 2011). However, these investigations have revealed a lack of consensus among students. This finding echoes Cohen's (1985: p.3) earlier conclusion that feedback is "one of the more instructionally powerful and least understood features in instructional design".

The purpose of this article is to explore possible reasons why students perceive the effectiveness of feedback differently from one another. As a conceptual paper it does not conform to the standard format of empirical research papers; instead, it develops an argument that perceptions regarding the effectiveness of feedback vary widely among students, and may be influenced by factors other than feedback quality. We challenge the idea that a universally effective feedback practice exists, and propose an original model that may account for some of the inter-individual variation by drawing on two established theories about the learning process, namely Vygotsky's theory of Social Constructivism and Learning Style theory. The paper concludes with implications and recommendations for pharmacy educators grounded in research findings.

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Developing a conceptual model relating feedback effectiveness to learning styles

According to The Oxford Dictionary of English (2010), learning is “the acquisition of knowledge or skills through study, experience, or being taught”. Developmental psychology has been concerned with how learning and development are related, so the term ‘development’ will also be used throughout this paper. There are many well-established theories about how people learn. They reflect two broad schools of thought; either that everyone learns in the same way, or that learning is based on individual differences and therefore we each learn differently.

Insights about the role of feedback in learning from Vygotsky’s theory of Social Constructivism

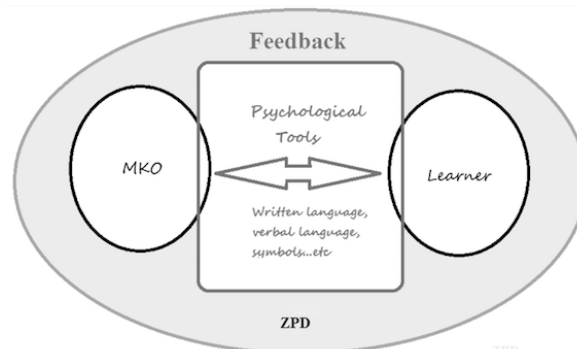
Our current understanding of the relationship between learning and human development owes much to the work of Russian psychologist Lev Vygotsky in the 1930s, although his work was not widely known until an English translation was published about forty years ago (Vygotsky, 1978). Vygotsky believed that cognitive development, moving from a state of “actual development” to “potential development”, occurs when a learner is confronted by a task that lies just beyond his/her independent reach. Learning takes place in this “Zone of Proximal Development” with the assistance of someone who is more knowledgeable about the task, *i.e.* a “More Knowledgeable Other (MKO)”. Vygotsky referred to the forms of communication used by the MKO, such as symbols, formulae, written language and verbal language, as psychological tools. He claimed that these must be used within a social context, that is, via social interaction between the learner and MKO. Vygotsky proposed that all intellectual development evolves from social (interpersonal) to individual (intrapersonal). His theory is referred to as Social Constructivism because it posits that social interaction is essential to the construction of knowledge.

Vygotsky did not use the word feedback in his writing. However, re-interpreting his description of how an MKO (*e.g.* a tutor) uses an appropriate psychological tool (*e.g.* verbal language) within a social context (*e.g.* workshop) to help learners reach their potential development (*i.e.* learn), we argue that the Vygotskian learning process emphasises what is called feedback in modern educational language (see Figure 1). According to Vygotsky then, the learning process is universal – all humans develop within a sociocultural context based on ‘feedback’ from one or more MKOs.

Variation in perceptions of feedback effectiveness among students is widespread

Much of what students have had to say about their experiences with feedback demonstrates that there is significant variance in how they perceive the value of feedback they have received, as well as the impact of feedback on their learning. For example, in national

Figure 1: A diagrammatic representation of the learning process according to Vygotsky's Theory of Social Constructivism



surveys investigating the “first year experience” in Australia, students across nine universities were divided on the issue of whether teaching staff usually gave helpful feedback; around one third agreed, while two-thirds disagreed (Krause *et al.*, 2005). Hall, Hanna & Quinn (2012) similarly reported that around a third of pharmacy students were satisfied with the feedback they received from their teachers, while two-thirds were dissatisfied. Furthermore, Sinclair & Cleland (2007) found only around half of undergraduate medical students (46%) collected feedback on an assessment task, suggesting an almost even split between those who expected to receive valuable feedback and those who did not. Large-scale national student satisfaction surveys carried out annually in the United Kingdom have explored the impact of feedback on learning since 2005. The most recent data available (Higher Education Funding Council for England, 2015) indicated approximately two thirds of students felt feedback on their work helped clarify things they did not understand; therefore, a third did not believe feedback had supported their learning. In another study, Hounsell *et al.*, (2008) investigated the degree to which students across six bioscience courses considered the feedback they received helped improve their learning; in most courses there was a degree of variance with students divided on the issue, although in one there was broad agreement that the feedback had not helped their learning. Thus, our critical reading of the literature reveals a much more nuanced picture of feedback than many researchers have been willing to acknowledge. Perera *et al.* (2008: p. 397) summarise this point nicely; although there is a large amount of evidence regarding the usefulness of feedback for learning, “its effective use in actual practice appears to be suboptimal”.

Exploring reasons students perceive the effectiveness of feedback differently from each other

In order to design effective curricula, it is important to understand the reasons for perceived variance in feedback effectiveness among students. Next, we reflect on two potential reasons that have been reported previously.

Poor quality feedback

It is likely that some students perceived the feedback they received to be of little value because it was of poor quality. Although there is little consensus in the literature about what defines quality in relation to feedback, Freeman & Lewis (1998) identified a number of characteristics of poor feedback *e.g.* delayed, uninformative, focused on low level learning goals, or excessively critical. In their paper outlining seven principles of good feedback practice, Nicol & MacFarlane-Dick (2006) lamented that the higher education sector has been much slower to transform teaching practices than the school sector. This was despite earlier research by Black & Wiliam (1998: p.61) demonstrating that classroom-based formative assessment and feedback produced learning gains “amongst the largest ever reported for educational interventions”. Nicol & MacFarlane-Dick’s assertion is supported by Weaver (2006: p.392) who reported that “some academics appear to lack the knowledge of how to provide effective feedback”, and Perera *et al.*, (2008) who noted a disparity between what medical students wanted regarding formative feedback, and what their teachers actually provided. However, the fact that between a third and half of all students in the previously described studies (Krause *et al.*, 2005; Sinclair & Cleland, 2007; Hall *et al.*, 2012) reported satisfaction with their feedback hints that some high quality feedback was provided. Therefore, quality is probably not the only influence on the perceived effectiveness of feedback.

Different conceptions and perceptions about feedback among staff and students

There was a range of issues raised by students across the various studies, but the most common complaint reported by Ferguson (2011) was that written feedback from teachers was sometimes ambiguous and confusing. Research by Weaver (2006) suggests this may result from staff and students having different “conceptions”; students new to a discipline may not share their teachers’ understanding of academic discourse and therefore experience difficulty making meaning of the feedback. Staff and students may also have different perceptions about feedback that is provided. In a large-scale study involving eight universities in Hong Kong, staff and students were asked whether students were given detailed written feedback that helped them improve their next assignment (Carless, 2006). This research identified a significant difference between staff and student perceptions; almost 40 percent of tutors indicated detailed feedback was provided “often”, whereas only ten percent of students reported receiving detailed feedback “often”. In another study by Sonthisombat (2008), preceptors and pharmacy students were asked to evaluate the teaching behaviours of the preceptors. There was general agreement except when it came to ratings regarding feedback provided to students; 83 percent of preceptors rated their own teaching behaviour “giving students positive feedback for good work” as “well done” or “adequate”, while only 36 percent of students

rated the preceptor’s feedback as “well done” or “adequate”. These studies suggest that some of the variance in feedback effectiveness among students may be due to a diversity of conceptions and perceptions about feedback. It is possible that some students were outside the Zone of Proximal Development; in other words, the potential development expected by their teachers was beyond students’ reach even with the assistance of a MKO. While this explanation may account for some of the dissatisfaction students have reported with feedback, it is unlikely to be a major influence as the baseline knowledge (actual development) of each student cohort and the difficulty of the material should have been considered during curriculum design.

Challenging the assumption that a universally effective feedback practice exists

A corollary of Vygotsky’s theory is that educators should be able to design a feedback practice that all students find effective. However, the discovery of such an approach remains elusive, despite extensive research over a protracted period. Most of the studies exploring feedback to date have downplayed the variation in student perceptions. This ‘essentialising’ exposes an underlying assumption that a universally effective feedback practice exists. We challenge this assumption by suggesting that individual students may have different preferences for feedback. If this is true, it follows that MKOs (*e.g.* tutors) will most likely provide feedback which matches some individuals’ preferences for how they wish to receive feedback, but not others, leading to variance in feedback effectiveness. There is some preliminary evidence to support this hypothesis; in evaluating the findings of other researchers, Rowe and Wood (2008: p.78) concluded there is a “diversity of preferences” among students and therefore a variety of feedback approaches may be necessary to “meet individual needs”. In the following section we develop an argument to account for differences in feedback preferences that draws on learning style theory.

Learning styles

In contrast to Vygotsky’s theory, which focuses on similarities in the learning process for all learners, learning style theory focuses on the diverse ways in which individuals learn. A systematic review published in 2004 identified 71 models emerging from a wide array of disciplines including education, business, psychology, philosophy and sociology (Coffield *et al.*, 2004). Thirteen of these were classified as major models as they had made significant contributions to the development of the field.

Kolb’s Learning Style Inventory (LSI) has been particularly influential as it was one of the first tools created to assess learning style (Coffield *et al.*, 2004). The instrument was derived from his theory of Experiential Learning which postulates that learning involves resolving conflicts between opposing ways of

interacting with the world such as action versus reflection, and concreteness versus abstraction (Kolb, 1981). The LSI uses 12 questions to measure preferences for four learning modes, namely Concrete Experience, Reflective Observation, Abstract Conceptualisation and Active Experimentation (Kolb, 1981). Different learning styles result from combinations of two modes, which Kolb (2000) labelled Accommodating, Diverging, Converging and Assimilating styles (see Table I). He did not view learning styles as fixed personality traits; rather, that they become stable orientations over time as a result of consistent experiences with the world (Kolb, 2000). The inventory was intended to promote self-reflection and awareness of the variability in approaches to learning, not to limit or stereotype individuals according to learning style (Kolb, 1981).

Table I: Kolb’s learning styles (Kolb, 2000)

	Active Experimentation (AE)	Reflective Observation (RO)
Concrete Experience (CE)	Accommodating	Diverging
Abstract Conceptualisation (AC)	Converging	Assimilating

A model relating some of the variance in feedback effectiveness to learning styles

As discussed throughout this paper, some research has investigated students’ experiences of feedback. However, very little work has explored a potential relationship between the effectiveness of feedback and learning styles. While the learning styles literature makes it clear that individuals have different preferences for how they learn, it does not appear to explicitly indicate whether different learning styles result in different preferences for giving and receiving feedback. For example, no mention of such a relationship appeared in Coffield *et al.*’s (2004) systematic review of learning styles models, despite connections between learning styles and other pedagogical implications being described in detail. We therefore propose an original model that may account for some of the variation in feedback effectiveness that links learning styles with feedback preferences (see Figure 2).

The ‘Matched-Mismatched Feedback Model’ reflects a scenario in which one MKO (e.g. tutor) provides feedback to multiple students. Student 1 has a particular learning style (learning style 1) which influences his/her preference for receiving feedback. The MKO has a learning style which influences his/her preference for giving feedback. If Student 1 and the MKO have similar learning styles, there is likely to be a ‘match’ in the feedback given and received. Student 1 is thus more likely to engage with the feedback, and learn effectively. By contrast, Student 2 has a different learning style (learning style 2) and preference for receiving feedback. In this case, there is likely to be a ‘mismatch’ in the feedback given and received. Student 2 is therefore less

likely to engage with the feedback provided and experience the intended learning gains. In this example, Student 1 perceives the MKO’s feedback to be effective, whereas Student 2 perceives the same MKO’s feedback to be ineffective. Therefore, the model relates variations in perceived feedback effectiveness to learning styles. A summary of our argument leading to the model can be found in Table II.

Figure 2: Matched-Mismatched Feedback Model

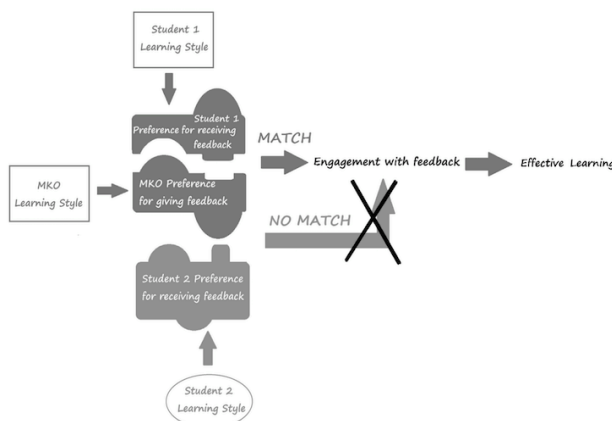


Table II: Summary of the argument leading to the Matched-Mismatched Feedback Model

- The literature indicates that feedback is important for learning
- But, not all students find feedback effective
- The reasons are likely to be multifactorial, including poor quality feedback and different conceptions and perceptions about feedback among staff and students
- Even good quality feedback may be perceived by some students to be ineffective
- This may occur if the learning style of the teacher does not match the learning style of the student as the preferences for how feedback is given and received may be ‘mismatched’

Implications and recommendations for pharmacy educators

Carless (2006: p.219) argues that feedback is “comparatively under-researched” in higher education. Hall (2012) further notes that feedback research focussing on pharmacy students has been limited. We therefore hope this article will stimulate dialogue within the pharmacy academy about this important topic, and lead to further empirical research to explore the validity of our model. We offer a number of suggestions to enhance the effectiveness of feedback that draw on the three potential reasons for variance discussed in this paper, namely poor quality feedback, different conceptions and perceptions between staff and students, and learning styles.

Poor quality feedback

To address Weaver's (2006) finding that academics may not know how to give effective feedback and Sonthisombat's (2008) similar finding in relation to preceptors, our first recommendation is that institutions consider making staff development compulsory for teaching staff and preceptors. The need for professional development to be mandatory is complementary to Perera *et al.*'s (2008) suggestion that institutional policies might be necessary to ensure students receive effective feedback. Training programs should describe the relationship between feedback and learning, and summarise what is currently known about the characteristics of quality feedback (see Table III). The "Seven Principles of Good Feedback Practice" may serve as a useful starting point, although the authors note that the literature on how teachers should deliver feedback remains undeveloped (Nicol & MacFarlane-Dick, 2006).

Table III: Characteristics of quality feedback (as summarised in Nicol & MacFarlane-Dick, 2006)

<ul style="list-style-type: none"> • Timely • Offers corrective advice • Directs students towards higher order learning goals • Includes praise with constructive criticism

Our second suggestion is that empirical research comparing the effectiveness of a range of feedback delivery approaches be encouraged and supported. This research would extend our current understanding beyond what students prefer to what can be demonstrated to enhance learning. Our third suggestion draws on the work of Black & Wiliam (1998) regarding the value of formative feedback. We recommend that staff who are responsible for curriculum renewal at a program level conduct an audit of classroom-based formative assessment to identify subjects or courses where existing learning activities do not adequately provide opportunities for feedback.

Differing conceptions and perceptions among staff and students

Our next suggestion relates to the issue that some students find feedback ambiguous or confusing (Ferguson, 2011), and emerges from Weaver's (2006) explanation that students may still be developing their conceptions of their discipline. We propose that explicit instruction about academic discourse and the conventions of the discipline be embedded into the learning activities of subjects (units). Our further suggestions in this section tackle the matter of staff and students having different perceptions about feedback (Carless, 2006; Sonthisombat, 2008). Staff development could provide an opportunity for academics to be made aware of student expectations regarding feedback; for example, that individual feedback

is considered more beneficial for learning than general feedback to the class (Hall *et al.*, 2012), that model answers and grades are insufficient (Perera *et al.*, 2008), and that feedback should accompany all teaching activities (Perera *et al.*, 2008). A further idea to develop with teaching staff is the value of re-conceptualising feedback as a 'dialogue' rather than simply as information to be transmitted. Nicol & MacFarlane-Dick (2006) contend that encouraging dialogue with teachers and peers helps learners develop self-regulation. Carless (2006) posits that "assessment dialogues" also help students develop an understanding of performance standards necessary for lifelong learning. Research exploring the student perspective supports this approach to feedback; Perera *et al.* (2008) reported that students feel teacher-student dialogue is important to clarify issues around assessment.

Learning styles

Finally, we offer three pedagogical recommendations concerning feedback related to learning styles; to educate staff and students about learning styles and learning style theory, avoid modifications of teaching based on matching feedback preferences, and individualise instruction. According to Coffield *et al.* (2004), there is scant experimental evidence that has tested the implications of Kolb's learning styles for teaching. Therefore, the suggestions made by most researchers have been extrapolated from his associated experiential learning theory. Although Kolb felt that learning styles were stable preferences, he argued that not only was it possible to become competent in all four learning modes, a process known as "integrative development" (Kolb, 2014), but the capacity to adapt to situational circumstances is a key aspect of learning (Kolb, 1981). We recommend that staff and students have the opportunity to discover their learning style by completing Kolb's LSI, or a related instrument developed for the pharmacy context such as the Pharmacist's Inventory of Learning Styles (Austin, 2004). Any such testing should be accompanied by an education program explaining the role learning styles may play in influencing feedback preferences and thus perceived feedback effectiveness; our Matched-Mismatched Feedback Model may prove useful in this regard. It is imperative that this training emphasises that it is possible to develop a broad range of capabilities outside learning style preferences, and that this is desirable for pharmacy students who are expected to become lifelong learners. The next, somewhat counterintuitive, recommendation is for staff to avoid deliberately altering their teaching to match the feedback preferences of their students. In their systematic review of learning styles, Coffield *et al.* (2004) cite literature which suggests that although mismatched teaching and learning strategies may be uncomfortable for students, it encourages them to take responsibility for their own learning. Intentional mismatching might thus be added to Nicol & MacFarlane-Dick's (2006) list of effective feedback practices as students finding ways to engage with mismatched feedback will facilitate the development

of self-regulation and promote integrative development. Coffield *et al.* (2004) also suggested that mismatches might reduce the boredom that can develop in familiar learning environments. We posit that such tensions will position students in Vygotsky's zone of proximal development, making learning possible. Our third recommendation derives from both Vygotsky and Kolb's assertions that individualised instruction is important for learning. In an era of massification of higher education and reduced staff-student ratios, educational technologies offer one solution. In learning management systems such as Blackboard®, instructors can complete 'Correct feedback' and 'Incorrect feedback' fields for individual questions in online quizzes. When tests with these fields are deployed, personalised feedback is generated automatically for each student. However, very little research has investigated the uptake of this pedagogical innovation. We suggest empirical research to evaluate the impact that individualising feedback in this manner has on student perceptions of its effectiveness.

Conclusion

Variation in the perceived effectiveness of feedback among students is widespread. The aim of this conceptual paper was to explore possible reasons for the variance and culminated in the Matched-Mismatched Feedback Model. Further empirical research to explore the validity of our model is recommended. The authors offered a range of recommendations to pharmacy educators and hope this article will stimulate dialogue about the comparatively under-researched topic of feedback within the pharmacy academy.

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