Northumbria Research Link

Self-Assessment of Knowledge in Higher Education

Tony Blackwood

Newcastle Business School

Northumbria University

Abstract

An appreciation of the extent of one's knowledge has been referred to as metaknowledge and if well developed, this can help students to develop effective learning strategies. Accurate self-assessment can highlight gaps in knowledge and prompt initiatives to address these deficiencies. However previous studies suggest that metaknowledge tends to be poorly developed and the most common finding is that individuals tend to display overconfidence in their knowledge, by overestimating how much they know. This research addresses learning in a higher education environment and focuses specifically on students studying at a large UK business school. It aims to determine their ability to appreciate the extent of their knowledge in the context of their learning programme and to explore the relationship between this ability and academic performance. The study takes a quantitative approach, employing a research instrument incorporating a multiple choice test related to the participants' study programme and an accompanying questionnaire. Having completed data collection, the next stage in the research is to analyse this data to determine whether and the extent to which, respondents display overconfidence in their assessment of their own knowledge. Individual differences in respect of age, gender and nationality will also be explored as well as the association between the ability to accurately self assess knowledge and academic performance.

Introduction

This brief explains ongoing research on the general theme of self-assessment in education, with specific emphasis on knowledge. An appreciation of the extent of one's knowledge has been referred to as metaknowledge and it has been argued that, if well developed, this can assist in making better informed decisions and choices. However, previous research suggests that appreciation of the scope and limits of primary knowledge tends to be poorly developed. Many studies investigating the extent to which people are able to assess the extent of their own knowledge, have concluded that self-assessment accuracy is typically poor and the most common finding is that individuals tend to display overconfidence, by overestimating how much they know. In an educational context, if students have a poor appreciation of the extent of their knowledge this may hamper their learning, as accurate self-assessment of knowledge can usefully inform learning strategies. This study aims to determine the ability of students in higher education to appreciate the extent of their knowledge and to investigate the degree to which this ability is associated with academic performance. These findings can assist educators in promoting learning by helping to determine the potential value of initiatives for improving metaknowledge. The study also addresses individual differences in the accuracy of self assessment of knowledge and findings in this respect can indicate where such enhancement initiatives may be most usefully targeted.

Overconfidence

Acker and Duck (2008) refer to two different types of overconfidence. Referential overconfidence occurs in situations where, on being asked to rank themselves against their peers, individuals do so at an unjustifiably high level. Work in this domain has explored the *'better than average effect'* (Acker & Duck, 2008 p.1816) and previous studies investigating this phenomenon have reported a disproportionately high percentage of respondents indicating their belief that they are among the best performers in their peer group (Zenger, 1992). 'Stand-alone overconfidence' on the other hand, arises where individuals providing judgements of their own competence in its own right and without comparison to others, do so at an inappropriately high level. This tendency has frequently been detected in studies investigating the accuracy of self-assessment of knowledge (Pallier et al, 2002).

Overconfidence in Knowledge

An appreciation of the extent of one's knowledge has been referred to as metaknowledge (Ramnarayan, Strohscheider & Schaub, 1997) and if well developed, this can help in making better informed decisions and choices. However it has been argued that appreciating the scope and limits of primary knowledge entails a high level of expertise (Russo & Schoemaker, 1992) and it tends to be poorly developed (Lichtenstein, Fischhoff & Phillips, 1982). Many previous studies investigating the extent to which individuals are able to assess the extent of their own knowledge have concluded that self-assessment skills are typically poor. The most common finding is that individuals tend to display overconfidence in their knowledge by overestimating how much they know (Pallier et al, 2002). This has been found in many settings, with even subject experts tending to display overconfidence about their own knowledge and evidence to support this has been reported in studies of professionals in fields such as banking, economics, law and medicine (Allwood & Granhag, 1999).

Reasons for Overconfidence

It has been argued that stand-alone overconfidence may be at least partly explained by the fact that, unlike primary knowledge, metaknowledge tends to unrecognised, unrewarded and poorly developed in education (Russo & Schoemaker, 1992). It has also been suggested that individual differences may be influential and that further studies in this field should focus more on investigating these (Ackerman, Beier & Bowen 2002, Klayman et al, 1999). Thus an educational environment, in which individual differences can be explored, provides an interesting and important context in which to investigate the overconfidence hypothesis.

Implications for Education

Accurate self monitoring is an important ability for learning (Pieschl, 2009). If students are generally poor in appreciating the extent of their knowledge, their learning may be hampered, as accurate self-assessment of knowledge is useful in the development of learning and time management strategies (Smith, Shields & Washburn, 2003). This is particularly so in situations where learning embraces large volumes of information (Clarebout, Elen & Onghena, 2006), which suggests that it may be particularly important in higher education. While academic achievement in that environment is not exclusively influenced by knowledge, given its higher order demands, the ability of learners to accurately assess their own knowledge is important for complex learning activities as well as lower level

tasks (Pieschl, 2009). Those with the ability to accurately monitor their own knowledge can identify areas in which it is lacking and remedy this through further study. However those who are less able to do so and who overestimate their knowledge, will be unaware of their deficiencies and therefore will not be motivated to address them (Sternberg, 1998). Consequently, accurate self assessment is a significant issue for educators (Hacker, 1998) and since it may help to promote more effective learning, it is important that they assist learners in appreciating the limits of their knowledge (Kennedy, Lawton & Plumlee, 2002). Doing so may, in itself, assist learners to address the problem (Klayman et al 1999, Russo & Schoemaker, 1992). However, they may also wish to develop other initiatives to remedy poor metaknowledge, such as actively encouraging learners to question the accuracy of their knowledge.

The Study

Context and Aims

This research focuses on students studying at a large business school, offering a diverse range of study programmes at a UK-based University. It aims to determine their ability to appreciate the limits of their knowledge related to issues addressed in their learning programme. The study will also explore how this ability is associated with academic performance and investigate individual differences in respect of age, gender and nationality.

Method

A commonly used method for studying stand-alone overconfidence has been to employ a series of multiple choice questions, in which respondents indicate their preference from a number of alternative choices and express their confidence in that judgement. These have often been based on general knowledge and this approach has been defended on the grounds that it is important to have a good appreciation of the limits of our knowledge regardless of the subject matter (Russo & Schoemaker, 1992). However, while many previous studies have employed this type of approach in artificial situations (Kennedy, Lawton & Plumlee, 2002), this has given rise to concerns about the ecological validity of these investigations, in that experimental approaches may not accurately reflect behaviour in more natural situations (Bem & Lord, 1979). This study uses a similar method in that quantitative data was collected, using a research instrument incorporating a multiple choice test and an accompanying questionnaire. However to enhance its ecological validity, the test questions addressed knowledge related to issues addressed in their study programme.

The tests were administered in controlled conditions in a classroom environment during the participants' study programmes. This permitted the collection of data from students in a natural environment, rather than a purely experimental setting. The research instrument was designed to test for self-assessment ability by asking respondents to indicate, for each question in the test, firstly their choice of what they considered to be the correct answer from four alternatives. They were then required to indicate their confidence level in that response using a scale ranging from 25%, indicating a pure guess with a one in four probability of being correct, to 100%, indicating their absolute certainty in the response. Self assessment accuracy could subsequently be determined for each respondent using an indicator known as the bias score. This measures over or underconfidence in knowledge by comparing mean confidence across the test items, with the actual proportion of questions answered correctly.

Consequently it represents the extent to which participants' confidence was supported by the knowledge they demonstrated and thus permits investigation of the overconfidence theory. As well as completing the test, participants also completed an accompanying short, closed response questionnaire. This was used to collect demographic data to permit investigation of the relationship between self-assessment ability and individual characteristics.

Current Status of the Research

Data has been collected from approximately 600 participants who completed the test and questionnaire during their study programmes and the next stage of the research is to analyse this data to determine their self assessment accuracy. This will be achieved using the bias score discussed above and will indicate whether, and the extent to which, respondents display the overconfidence detected in previous studies. Individual differences in respect of age, gender and nationality will also be explored by comparing mean bias scores for sub samples based on these variables. The association between self assessment accuracy and academic performance will be investigated by exploring the relationship between bias scores and marks achieved by participants on their study programmes.

The implications of the findings for learning and the design of learning activities will then be addressed. Should the results indicate a general tendency for overconfidence, this finding can be communicated to learners to promote awareness of the issue and the potential general implications of taking decisions with an inadequate appreciation of supporting knowledge. If a negative association between overconfidence and academic performance is detected, disseminating this finding to both learners and tutors can raise awareness of the potential implications of overconfidence for academic achievement. This could be supplemented by diagnostic tests, similar to those used in this study, to provide learners with individual feedback on their own self-assessment accuracy and the general tendency within their peer group. As well as raising awareness in this manner, other interventions for moderating overconfidence, such as encouraging learners to actively question their own judgements, may also be initiated. Should the study indicate significant group differences, based on age, gender or nationality, disseminating this to learners will allow them to consider potential implications for them personally. It will also allow tutors to consider the potential implications for particular programmes or student groups, based on their demographics and enable tutors to target initiatives accordingly.

References

Acker, D. and Duck, N.W. (2008) Cross-cultural overconfidence and biased self-attribution, *The Journal of Socio-Economics,* 37, pp. 1815-1824.

Ackerman, P.L., Beier, M.E. and Bowen, K.R. (2002) What we really know about our abilities and our knowledge, *Personality and Individual Differences,* 33 (4), pp. 587–605.

Allwood, C.M. and Granhag, P.A. (1999) Feelings of Confidence and the Realism of Confidence Judgements in Everyday Life **in** Juslin, P. and Montgomery, H. (Eds) (1999) *Judgement and Decision Making: Neo-Brunswikian and Process-Tracing Approaches*, New Jersey, Lawrence Erlbaum Associates.

Bem, D. J. and Lord, C. (1979) Template matching: A proposal for probing the ecological validity of experimental settings in social psychology, *Journal of Personality and Social Psychology*, 37 (6), pp. 833-846.

Clarebout, G., Elen, J. and Onghena, P. (2006) In search of the reliability of a Flemish version of the Knowledge Monitoring Assessment Test, *Metacognition Learning*, 1 (1), pp. 137–147.

Hacker, D. (1998) Definitions and Empirical Foundations in, Hacker, D., Dunlosky, J. and Graesser, A.C. (Eds) (1998) *Metacognition in Educational Theory and Practice*, London, Lawrence Erlbaum Associates.

Kennedy, E. J., Lawton, L. and Plumlee, E. L. (2002) Blissful Ignorance: The Problem of Unrecognized Incompetence and Academic Performance, *Journal of Marketing Education,* 24 (3), pp. 243-252.

Klayman, J., Soll, J. B., Gonzalez-Vallejo, C. and Barlas, S. (1999) Overconfidence: It Depends on How, What, and Whom You Ask, *Organizational Behavior and Human Decision Processes,* 79 (3), Sept, pp. 216-247.

Lichtenstein, S., Fischhoff, B. and Phillips, L. D. (1982) Calibration of probabilities: The state of the art to 1980 **in** Kahneman, D., Slovic, P. and Tversky, A. (Eds.) *Judgement under uncertainty: Heuristics and biases*, Cambridge: Cambridge University Press.

Pallier, G., Wilkinson, R., Danthiir, V., Kleitman, S., Knezevic, G. Stankov, L. and Roberts, R. D. (2002) The role of individual differences in the accuracy of confidence judgements, *The Journal of General Psychology,* 129(3), pp. 257-299.

Pieschl, S. (2009) Metacognitive calibration—an extended conceptualization and potential applications, *Metacognition Learning*, 4(1), pp. 3–31.

Ramnarayan, S., Strohscheider, S. and Schaub, H. (1997) Trappings of expertise and the pursuit of failure, *Simulation and Gaming*, 28 (1), pp. 28-43.

Russo, J.E. and Schoemaker, P.J.H. (1992) Managing Overconfidence, *Sloan Management Review*: Winter, 33 (2), pp. 7-18.

Smith, D.J., Shields, W.E. and Washburn, D.A. (2003) The comparative psychology of uncertainty monitoring and Metacognition, *Behavioral and Brain Sciences* 26, pp. 317–373.

Sternberg, R.J. (1998) Metacognition, abilities, and developing expertise: What makes an expert student? *Instructional Science* 26, pp. 127–140.

Zenger, T. (1992) Why Do Employers Only Reward Extreme Performance? Examining the Relationships among Performance, Pay, and Turnover, *Administrative Science Quarterly*, 37 (2), pp. 198-219.