The Impact of Formative Assessment and Learning Intentions on Student Achievement

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In the following report, Hanover Research provides an overview of the research related to formative assessment and learning intentions' impact on student achievement. The brief begins with an analysis of current research linking formative assessment to academic performance and then moves into a discussion of learning objectives' impact on student outcomes.

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Executive Summary and Key Findings

The beneficial outcomes of formative assessment, otherwise known as assessment for learning, have been touted by researchers and educators alike. The evidentiary basis of much of this confidence can be traced back to several seminal works, which synthesize and interpret existing research on the topic. Learning intentions, as an important component of formative assessment, have also been the subject of substantial research. This brief will provide an overview of the main discourses in literature linking formative assessment and learning objectives to student achievement.

Key Findings

- **Existing research yields promising conclusions regarding the impact of formative assessment on student academic achievement.** Though the focus of most research is not on summative test scores, findings indicate that students who receive formative assessment perform better on a variety of achievement indicators than their peers do. While many of these studies exhibit methodological limitations, experts agree that the practice of assessment for learning shows promise in its ability to improve student performance.
- **The literature supports the efficacy of explicitly stated learning intentions and assessment criteria in improving student learning outcomes.** Learning objectives are the subject of a significant body of research, though most research has been conducted at the higher education level. Findings indicate that learning intentions, specifically as a part of guided instruction methods, positively impact student learning. Similarly, studies demonstrate that statement of learning objectives and assessment criteria improve students' self-assessment abilities and, as a result, improve learning outcomes.

Formative Assessment and Student Achievement

Educators have long taken the beneficial impact of formative assessment for granted. Numerous sources tout the ability of these strategies to improve student academic achievement. However, the definition of formative assessment remains amorphous and comprises a significantly variable set of practices. Black and Wiliam, authors of the seminal investigation into the efficacy of formative assessments, put forth the following as a working definition:

> We use the general term assessment to refer to all those activities undertaken by teachers – and by their students in assessing themselves – that provide information to be used as feedback to modify teaching and learning activities. Such assessment becomes formative assessment when the evidence is actually used to adapt the teaching to meet student needs.[1]

Their guidelines emphasize the applications of formative assessments, thereby defining these assessments by their use. Specifically, to adapt instruction to particular learners' needs based on assessment results. Other, broader definitions exist as well. For instance, Dunn and Mulvenon distinguish between formative assessments, or "assessments designed to monitor student progress during the learning process (i.e., assessment for learning)" and formative evaluations. The latter is defined as:

> …the evaluation of assessment-based evidence for the purposes of providing feedback to and informing teachers, students, and educational stakeholders about the teaching and learning process. Formative evaluation also informs policy, which then affects future evaluation practices, teachers, and students.[2]

Despite the lack of consensus on definitions or even the specific techniques that comprise formative assessments, many sources point to the pathway of knowledge acquisition as a distinguishing feature. Essentially, formative assessment seeks to present students with explicit goals or outcomes of instruction, to help them assess their current position in relation to these goals, and to equip them with the tools to bridge the gap between the two. Thus, effective formative assessment must help students answer the following questions:[3]

- **Where Am I Trying to Go?** Students need clearly articulated, concise learning targets to be able to answer this first question. Learning is easier when learners understand what goal they are trying to achieve, the purpose of achieving the goal,

[1] Black, P. and D. Wiliam. "Inside the Black Box: Raising Standards Through Classroom Assessment." *Phi Delta Kappa*, October 1998. p. 2. http://faa-training.measuredprogress.org/documents/10157/15652/InsideBlackBox.pdf

[2] Dunn, K. and S. Mulvenon. "A Critical Review of Research on Formative Assessment: The Limited Scientific Evidence of the Impact of Formative Assessment in Education." *Practical Assessment, Research & Evaluation*, 14:7, March 2009. p. 3. http://www.pareonline.net/pdf/v14n7.pdf

[3] Bullet points quoted from: Chappuis, S. and R. Stiggins. "Classroom Assessment for Learning." *Educational Leadership*, 60:1, September 2002. p. 3-4. http://hssdnewteachers.pbworks.com/w/file/fetch/50394085/Classroom.Assessment.for.Learning.Chappuis.pdf

and the specific attributes of success. Teachers should continually help students clarify the intended learning as the lessons unfold—not just at the beginning of a unit of study.

- **Where Am I Now?** All of these strategies help students ascertain—and, even more important, learn how to ascertain—where they are and where they need to be, an awareness that is central to their ultimate success.
- **How Do I Close the Gap?** Assessment for learning helps students know what to do to move from their current position to the final learning goal. To meet learning goals, students must participate fully in creating the goals, analyzing assessment data, and developing a plan of action to achieve the next goal.

These three core processes form the theoretical underpinning of formative assessment. Further conceptions note that teachers, students, and peers all play a role in the learning process and, as a result, each have roles to play in formative assessment. Figure 1.1 below depicts the five main strategies associated with assessment for learning and defines them as they relate to the various players in assessment. Teachers' roles emphasize setting clear goals, making aspects of success explicit, providing useful feedback, and encouraging peer- and self-reflection. Peer and learner requirements center on understanding learning objectives and continuously assessing progress against these.

Figure 1.1: Aspects of Formative Assessment

<table>
<tr><th>Actor</th><th>Where the Learner is Going</th><th>Where the Learner is Right Now</th><th>How to Get There</th></tr>
<tr><td>Teacher</td><td rowspan="3">1 Clarifying learning intentions and criteria for success

Understanding and sharing learning intentions and criteria for success

Understanding learning intentions and criteria for success</td><td>2 Engineering effective classroom discussions and other learning tasks that elicit evidence of student understanding</td><td>3 Providing feedback that moves learners forward</td></tr>
<tr><td>Peer</td><td colspan="2">4 Activating students as instructional resources for one another</td></tr>
<tr><td>Learner</td><td colspan="2">5 Activating students as the owners of their learning</td></tr>
</table>

Source: Black and Wiliam[4]

[4] Black, P. and D. Wiliam. "Developing the Theory of Formative Assessment." *Educational Assessment, Evaluation and Accountability*, 21:1, February 2009. p. 8. http://teacherscollegesj.edu/docs/47-Developingthetheoryofformativeassessment_12262012101200.pdf

LIMITATIONS OF THE RESEARCH

There are several aspects of formative assessment that make it difficult to reliably quantify the impact of interventions on student performance. The first stems from the lack of a universal definition of the term or what practices fall within its purview. This absence of consistent terms makes research difficult because different studies employ a variety of conceptions. According to Dunn and Mulvenon, "the vagueness of the constitutive and operational definitions directly contributes to the weaknesses found in the related research and dearth of empirical evidence identifying best practices related to formative assessment."[5]

However, several experts argue that this vague conception is at the very heart of formative assessment's efficacy. It is meant to be used in a variety of contexts and classrooms and therefore must not be confined by rigid parameters. The flexible and responsive nature of assessment for learning practice is therefore manifest in attempts to define it. Clark concludes that "the key notions of modification and adaptation to meet the needs of specific learners or groups of learners, is a key feature and one that undermines consistent application and standardization."[6]

The flexible and responsive nature of assessment for learning practice is a "key feature and one that undermines consistent application and standardization."

Due to these considerations, quantitative analysis of formative assessment interventions is difficult to carry out and validate. Fidelity of implementation, variations in techniques used, and the presence of intervening variables, such as unique teacher characteristics, are just a few of the reasons why existing research should be interpreted with an amount of caution. However, according to Clark, "the essential point remains that quantitative ambiguities are not sufficient to obscure or undermine the deep cognitive and meta-cognitive processes germinated by high-quality interaction and effective feedback; a point widely understood and accepted."[7] Based on this premise, we will discuss several important studies on the efficacy of formative assessment strategies, particularly as they relate to academic outcomes.

[5] Dunn and Mulvenon, Op. cit., p. 2.
[6] Clark, I. "Formative Assessment: Policy, Perspectives and Practice." *Florida Journal of Educational & Administration Policy*, 4:2, Spring 2011. p. 167. http://files.eric.ed.gov/fulltext/EJ931151.pdf
[7] Ibid., p. 169.

THE IMPACT OF FORMATIVE ASSESSMENT ON ACADEMIC ACHIEVEMENT

One of the most frequently cited works on formative assessment is the research review conducted by Black and Wiliam in 1998. The analysis compiled over 250 publications, both quantitative and qualitative, which were found to:

> …show that innovations that include strengthening the practice of formative assessment produce significant and often substantial learning gains. These studies range over age groups from 5-year olds to university undergraduates, across several school subjects, and over several countries.[8]

Approximately 20 of these studies were quantitative and, of these, the effect sizes reported for formative assessment interventions ranged from 0.40 to 0.70, particularly large for education interventions. To put this in perspective, an effect size of 0.40 would raise the performance of a student who received the intervention to that of a student in the top 35 percent of those not involved in the intervention.[9] Put another way, this growth would represent "a gain that is roughly double the average growth U.S. children in the upper primary to lower secondary grades would be expected to make on standardized tests in a school year."[10]

After synthesizing over 250 publications, Black and Wiliam, concluded that formative assessment is perhaps the most effective educational practice when it comes to improving academic achievement.

Black and Wiliam cite several studies to support their claims of efficacy. One such example observed 838 5-year-old students, primarily from disadvantaged backgrounds, drawn from six regions in the U.S. Teachers in the experimental group were trained to implement a system of formative assessment that involved a progression where students were tested, an educational plan was designed based on their results, students were retested, and additional modifications to their plans were made based on this second set of results. Student performance was measured in pre- and post-intervention tests. The researchers found that students whose teachers were in the experimental group produced significantly higher scores in reading, mathematics, and science than the control group.[11]

Another study conducted in Portugal examined the impact of formative assessment teacher training on the mathematics performance of students. The experiment assigned 25 teachers to be trained in developing students' self-assessment skills. Another 20 teachers acted as the control group. A total of 246 students aged 8 to 9 and 108 aged 10 to 14 were in the experimental group. The researchers found that, while both experimental and control groups experienced learning gains on post-intervention tests, the gains of the 8- to 9-year

[8] Black and Wiliam, "Inside the Black Box," Op. cit., p. 3.
[9] Ibid., p. 3.
[10] Bennett, R. "Formative Assessment: Can the Claims for Effectiveness Be Sustained?" Educational Testing Service, 2009. p. 3. http://www.iaea.info/documents/paper_4d5260ae.pdf
[11] Black, P. and D. Wiliam. "Assessment and Classroom Learning." *Assessment in Education*, 5:1, March 1998. p. 12.

old intervention group were twice that of the control group. The older students in the experimental group also experienced larger learning gains than their control counterparts, though the difference was not statistically significant.[12] An essential component of the intervention was daily self-assessment by students, which required that teachers acquaint them with daily learning objectives and assessment criteria.[13]

Formative assessment may be disproportionately beneficial for underachieving students. One study found an effect size for learning disabled populations of 0.70.

A notable finding of Black and Wiliam's work is that formative assessment has a disproportionately beneficial impact on low-achieving students. They state that, "while formative assessment can help all pupils, it yields particularly good results with low achievers by concentrating on specific problems with their work and giving them a clear understanding of what is wrong and how to put it right."[14] The assumption here is that formative assessment shows students that underperformance is not innate and that improvements can be made through targeted changes. One study that highlights this finding is the meta-analysis conducted by Fuchs and Fuchs in 1986. Their research comprised 21 studies with students with learning disabilities from pre-school to grade 12. Each employed an experimental and control group and an assessment frequency of two to five times per week. From a total of 96 effect sizes, the calculated mean was 0.70, on the larger end of Black and Wiliam's range.[15] Black and Wiliam's conclusion, then, is that frequent formative feedback is particularly beneficial for low-achieving populations.[16]

Dunn and Mulvenon produce one of the most cogent responses to the Black and Wiliam synthesis, contending that the quality of data included in their review is not sufficient to draw the definitive conclusions that they do. The first study that they take issue with is the Fuchs and Fuchs piece, which, according to Dunn and Mulvenon, suffers from uneven data quality. Of the effect sizes included in that meta-analysis, almost 72 percent were only rated of "fair" technical quality. In addition, the composite sample observed in the meta-analysis consisted of 83 percent learning disabled students.[17] Dunn and Mulvenon argue that:

> While an average effect size of 0.70 is astounding, the issue of generalization to the population at large and the quality of the research reviewed creates serious problems for using this article to conclusively show that formative assessment improves academic achievement in general.[18]

The authors cite small sample size in the study conducted on Portuguese mathematics students and confounding variables in the examination of 5-year-old students from

[12] Ibid., p. 10.
[13] Ibid., p. 10.
[14] Black and Wiliam, "Inside the Black Box," Op. cit., p. 6.
[15] Black, P. and D. Wiliam. "Assessment and Classroom Learning." Op. cit. p. 15.
[16] Black and Wiliam, "Inside the Black Box," Op. cit., p. 3.
[17] Dunn and Mulvenon, Op. cit., p. 5.
[18] Ibid., p. 5.

disadvantaged backgrounds as further examples of weak data. In general, Dunn and Mulvenon's frequently cited problems with Black and Wiliam's studies include: small sample sizes, insufficient detail regarding control and experimental groups' treatment, and limited population diversity leading to reduced generalizability.[19] The authors reviewed an additional nine studies related to formative assessment's impact on student achievement. Four were related to elementary and secondary school learners and five addressed undergraduates. All are presented in Figure 1.2 on the next page. In general, they found that these studies yielded promising results, though they exhibited similar methodological limitations as the Black and Wiliam studies did.[20]

Although there are several flaws in the research methodology used to investigate formative assessment to date, this does not invalidate the promise of these studies' findings. Critics of Black and Wiliam's analysis do not refute that the studies support assertions of formative assessment's efficacy. They merely caution against the notion that the research is sufficient to *conclusively* demonstrate formative assessment's impact on student achievement.[21] Critics contend that Black and Wiliam's article would be better defined as a good qualitative review of the literature on an ill-defined, amorphous intervention type.[22] They therefore call for a better definition of formative assessment and more rigorous empirical evidence to support its impact. Bennett concludes that:

> The primary and secondary school effectiveness research does suggest that the practices associated with formative assessment can, under the right conditions, facilitate learning. However, these effects may vary markedly across implementations of the multiplicity of practices that fall under current definitions of formative assessment, as well as across subpopulations of students.[23]

[19] Ibid., p. 6.
[20] Ibid., p. 7.
[21] Dunn and Mulvenon, Op. cit., p. 7.
[22] Bennett, Op. cit., p. 5.
[23] Ibid., p. 8.

Figure 1.2: Empirical Studies of Formative Assessment's Impact on Academic Achievement

AUTHORS	DESCRIPTION & FINDINGS	WEAKNESSES
Thompson et al. (2004)	• Study looked at student (grades 3-5) achievement results based on the level of engagement their teachers registered in the California Formative Assessment Support System for Teachers (CFASST). • No difference noted according to level of engagement. • Students whose teachers participated in CFASST training scored significantly higher on California's standardized tests (CAT-6) in math, reading, language arts, and spelling.	• Small effect sizes (0.03 to 0.40) may indicate that the results of intervention are not necessarily proportionate to the resources dedicated to it.
Wininger (2005)	• A group of 71 undergraduate students in an Educational Psychology class was studied to ascertain the impact of formative assessments on the second administration of an exam. The experimental group (34 students) got feedback on performance from professor and peers and was assisted with self-assessment. • Students in the experimental group performed significantly better on the second administration of the exam (9 point gain) than the control group did (2 point gain).	• Small sample size. • Researcher bias due to the fact that the investigator was also the students' professor.
Wiliam et al. (2004)	• 24 secondary school teachers from two LEAs in the UK were chosen to receive 6 months of training in implementation of formative assessments. Student performance on a variety of summative tests was measured to determine impact of intervention. • Found the mean effect size of the training to be 0.32 or roughly the equivalent of one half of one GCSE grade per subject.	• Methods of comparison between control and experimental group differed from teacher to teacher. Therefore it is difficult to draw conclusions from quantitative data. • Significant limitations to generalizability because each teacher was essentially their own "mini-experiment." Therefore results need to be interpreted cautiously.
Ruiz-Primo and Furtak (2006)	• Four teachers participated in a 5-day training in implementing formal embedded assessments in science instruction. They were further taught how to use these assessments to provide immediate feedback to learners. Student performance was measured using designed pre-tests, embedded assessments, and post-tests. • Found that student performance was significantly impacted by the intervention. • Data demonstrated that fidelity and quality of implementation varied by teacher and that, generally, those with better quality implementation produced higher scores on the post-test.	• Sample size of four teachers is severely limited. • Not able to attribute achievement gains solely to intervention since other teacher characteristics may have contributed to differences in student performance. • Students were able to perform tasks "correctly" but often were unable to give justifications for why they answered a certain way.

Authors	Description & Findings	Weaknesses
Sly (1999)	• Studied 614 university students enrolled in a first year economics course in Australia. Presented students with option to take practice tests before unit assessment exam. • Those who elected to take a practice test performed significantly better on end of unit exam than those who did not take the practice test. • This pattern continued in the second unit where the same high performing students, even though there was not a practice test for this unit, performed significantly better on the unit exam.	• This study may suffer from effects of self-selection – namely, that more intelligent students were the ones who elected to take the practice tests and therefore unit exam performance may not be related to intervention. • This issue was discussed in the report, but measures were not implemented to control for self-selection. • Relatively small score differences (4 to 5 points).
Henly (2003)	• Study conducted in Australia at the University of Queensland. Investigated undergraduate students' performance on assessments for the Metabolism and Nutrition unit of an integrated basic science course. Provided all students the opportunity to use formative assessment tools during the unit. • Found that students in top 10 percent of class accessed formative assessments twice as often as students in bottom 10 percent of class.	• Correlation between access of formative assessments and performance does not definitively prove causation. • Already high performing students may be more likely to use formative assessment tools.
Buchanan (2000)	• Study examined 148 undergraduate students taking an introductory psychology unit. They were given access to an online program of formative assessments and the number of times they accessed this program was recorded. • Found that students who accessed the program received significantly higher scores on the final exam than those who did not. The effect size for this variable was 0.03.	• Small effect size. • Self-selection.
Wang (2007)	• The research assessed the performance of 516 grade 7 students in Taiwan after use of the Formative Assessment Module of the Web-based Assessment and Test Analysis System (FAM-WATA). The system is a multiple-choice online formative assessment unit that utilizes six types of formative assessment: repeat the test, correct answers not given, query scores, ask questions, monitor answer history, and pass and reward. • Found that students who used FAM-WATA showed significant learning gains, as displayed on the study's post-test.	• The study did not employ a control group; it merely compared student performance across several formative intervention types. Learners assigned to the FAM-WATA group outperformed those in other groups. • Therefore, results cannot be solely attributed to intervention, and may be due to benefits of general instruction.
Velan et al. (2002)	• Study examined 44 undergraduate medical students in Australia. Measured the impact of online self-assessment on student performance in a pathology course. • Found that, from the first attempt to the third attempt of an online self-assessment, students showed significant improvement in performance.	• Small sample size • Students took the same assessment and received feedback on it multiple times. Therefore it is possible that improved performance resulted from previous knowledge of the assessment.

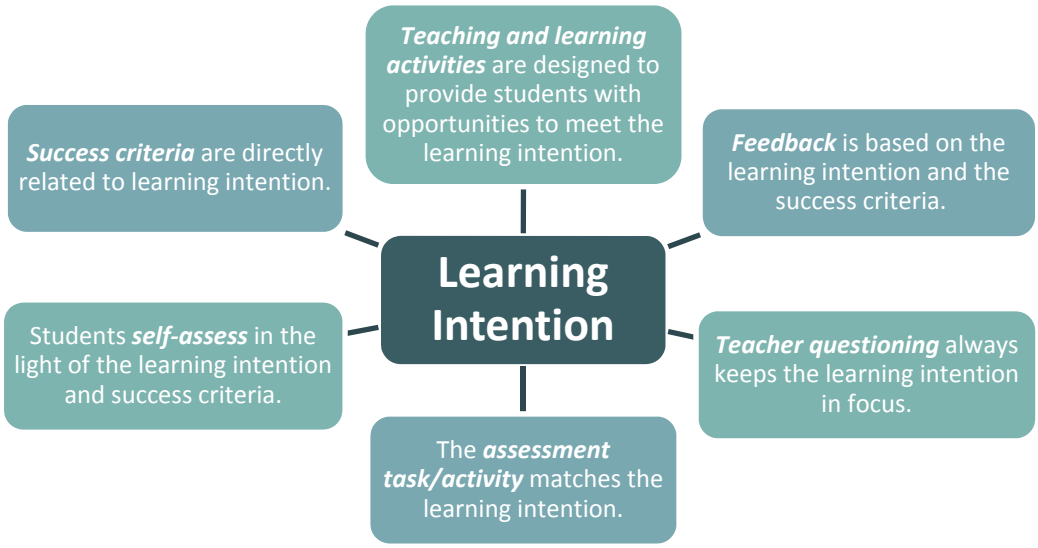
Source: Dunn and Mulvenon[24]

[24] Dunn and Mulvenon, Op. cit., p. 7-8

Learning Intentions and Academic Achievement

Clearly stated learning intentions are an essential component of formative assessment strategy. They help teachers to be mindful of what their goals are to effectively plan and deliver lessons and they facilitate student learning by communicating expectations about the desired outcomes for each lesson. As a result, experts assert, "research on instructional techniques in all core content areas has found that explicitly linking classroom activities to learning goals helps students understand the purpose of the instruction and feel motivated to engage with the ideas."[25] This is particularly true for underachieving students who benefit from a clear understanding of where each lesson is going.[26] Reed notes that, in order for learning to be effective "teachers and students consistently need to be aware of where the lesson is headed and how the various activities build toward that outcome."[27] The characteristics of effective learning intentions are presented in Figure 1.3 below.

Figure 1.3: Learning Intentions



Source: Assessment for Learning[28]

[25] Reed, D. "Clearly Communicating the Learning Objective Matters!" *Middle School Journal*, 43:5, May 2012. p. 17. http://web.a.ebscohost.com/ehost/pdfviewer/pdfviewer?sid=9df744b4-73d5-47b9-8993-07f9fd8adca0%40sessionmgr4001&vid=5&hid=4214

[26] Ibid., p. 17.

[27] Ibid., p. 23.

[28] "Background." Assessment for Learning. http://www.assessmentforlearning.edu.au/professional_learning/learning_intentions/learning_research_background.html

Support for learning intentions' positive impact on student achievement derives from research linking this technique to the successful practices of guided instruction and student self-regulation.

General support for learning objectives' impact on student achievement derives from research considering various instruction types. Generally, guided instruction yields better academic achievement than do less structured endeavors. Kirschner, Sweller, and Clark state that "controlled experiments almost uniformly indicate that when dealing with novel information, learners should be explicitly shown what to do and how to do it."[29] The authors cite a study conducted by Klahr and Nigam with 112 students in grades 3 and 4 that investigated whether they learned more in science class through guided instruction or through self-discovery. According to Kirschner, Sweller, and Clark, "the findings were unambiguous. Direct instruction involving considerable guidance, including examples, resulted in vastly more learning than discovery."[30] As indicated in these findings, an essential component of guided or direct instruction is the statement of learning objectives and success criteria. This indicates that daily learning intentions are an important part of student learning.

Another notable aspect of learning intentions is their connection to self-regulated learning. According to experts, a student's ability to self-regulate is an essential skill for successful learning. Nicol and Macfarlane-Dick note that "there is a large body of empirical evidence, mainly published in the US, showing that learners who are more self-regulated are more effective learners: they are more persistent, resourceful, confident and higher achievers."[31] In order to gain this proficiency, students must have a clear knowledge of the goals for each lesson, their position in relation to these goals, and effective strategies for bridging the gap between the two. Self-regulation occurs as students measure their progress against stated goals.[32] Therefore, "intelligent self-regulation requires that the student has in mind some goals to be achieved against which performance can be compared and assessed."[33]

As indicated above, there is a significant body of evidence supporting the role of learning objectives. Notably, most of the research conducted thus far has been in higher education. There are, as a result, limitations to the extent to which generalizations can be made to younger populations. However, the trends noted in these studies have promising implications for the impact of learning intentions on elementary and secondary school students' performance. One study investigated two cohorts of 615 learners enrolled in an

[29] Kirschner, P., J. Sweller, and R. Clark. "Why Minimal Guidance During Instruction Does Not Work: An Analysis of the Failure of Constructivist Discovery, Problem-Based, Experiential, and Inquiry-Based Teaching." *Educational Psychologist*, 41:2, Spring 2006. p. 79. http://www.cogtech.usc.edu/publications/kirschner_Sweller_Clark.pdf

[30] Kirschner, Sweller, and Clark, Op. cit., p. 79; Klahr, D. and M. Nigam. "The Equivalence of Learning Paths in Early Science Instruction. Effects of Direct Instruction and Discovery Learning." *Psychological Science*, 15:10, October 2004. http://search.proquest.com/docview/807906083/3613C66962604B22PQ/2?accountid=132487

[31] Nicol, D. and D. Macfarlane-Dick. "Formative Assessment and Self-Regulated Learning: A Model and Seven Principles of Good Feedback Practice." *Studies in Higher Education*, 31:2, April 2006. p. 7. http://www.psy.gla.ac.uk/~steve/rap/docs/nicol.feedback.pdf

[32] Ibid., p. 2.

[33] Ibid., p. 2.

undergraduate business program at Oxford Brookes University (UK). The intervention, spanning two years, set to increase student knowledge of learning objectives and assessment criteria through a series of workshops, exemplars, and self-assessments. The researchers found that "participants at the assessment workshop subsequently achieved significantly better results in their assessed coursework." [34] In the following year, participants in the workshops were still outperforming their peers.[35] These findings indicate that a clear understanding of learning objectives and assessment criteria may contribute to student learning gains.

A second study, also conducted in the United Kingdom, examined a sample of 22 undergraduate students enrolled in a first year Environmental Sciences and Applied Biology course. As part of the intervention, learners were taught basic information on self-assessment and grading criteria. They met with teachers to develop a set of marking criteria and were provided examples of past work which varied in levels of proficiency. Students and teachers discussed the merits of each sample and revised their grading metrics accordingly. The learners then completed an assignment, assigned themselves grades for the project according to the agreed-upon criteria, and were assigned grades by teachers based on the same criteria. The researchers found that the level of agreement between self-assessed grades and teacher-assigned grades ranged from 50 to 80 percent, significantly higher than in previous studies that had not included student-teacher discussions and criteria formation. They concluded "that participation in discussions with tutors and discussing the construction of the marking criteria in the presence of exemplars has allowed students to discriminate between individual marking criteria and enhanced the quality of their learning." [36] Through a thorough understanding of assessment criteria and learning outcomes, students are able to improve their learning.

[34] Rust, C., M. Price, and B. O'Donovan. "Improving Students' Learning by Developing Their Understanding of Assessment Criteria and Processes." *Assessment & Evaluation in Higher Education*, 48:2, April 2003. p. 156. http://web.a.ebscohost.com/ehost/pdfviewer/pdfviewer?sid=ad50fd33-edc1-46b7-8b02-1965515748b3%40sessionmgr4003&vid=5&hid=4214

[35] Ibid., p. 156.

[36] Orsmond, P., S. Merry, and K. Reiling. "The Use of Exemplars and Formative Feedback When Using Student Derived Marking Criteria in Peer and Self-Assessment." *Assessment & Evaluation in Higher Education*, 27:4, August 2002. p. 318. http://web.a.ebscohost.com/ehost/pdfviewer/pdfviewer?sid=ad50fd33-edc1-46b7-8b02-1965515748b3%40sessionmgr4003&vid=7&hid=4214

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