Psychology Research and Practice Vol 1 Issue 1 2022
DOI: 10.37155/2972–3086–0101–1

Review

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Supporting the Use of Evidence-based Teaching Strategies in Schools: The Role of Educational Psychologists

Garry Hornby*

University of Plymouth, UK and University of Silesia at Katowice, Poland

***Correspondence to:** Garry Hornby, University of Plymouth, UK and University of Silesia at Katowice, Poland; Email: garry.hornby@plymouth.ac.uk

Received: September 19, 2022; **Accepted:** October 19, 2022; **Published Online:** October 31, 2022.

How to cite: Garry Hornby. Supporting the Use of Evidence-based Teaching Strategies in Schools: The Role of Educational Psychologists. *Psychology Research and Practice*, 2022; Vol. 1(1):page 02-07.
Doi: 10.37155/2972-3086-0101-1

Abstract: The most important factor in achieving quality education in schools is the effectiveness of teachers in facilitating learning. This requires teachers to use instructional strategies that have proven effectiveness and avoid those that do not.Therefore, teachers need to learn about evidence-based practices and know how they can be implemented in schools. The most useful sources of information on evidence-based educational strategies are large-scale syntheses and meta-analyses of research studies. A review of these sources identified eight teacher interventions that are considered to be key evidence-based strategies for improving student outcomes. Brief reviews of the theory and research evidence supporting each of them and links to videos illustrating their use in real-life classrooms are presented. Educational psychologists can use this information to support teachers in implementing these key evidence-based strategies in schools and thereby have a major impact on overall student outcomes in education systems.

Keywords: Educational psychologists; Evidence-based practice; Teaching strategies; Meta-analyses; Student outcomes; Video exemplars

1. Introduction

A critical component of high quality education in schools is the use of teaching strategies that have extensive bases of research evidence for their effectiveness, as well as the avoidance of those that lack such evidence (Hattie, 2009; Marzano, 1998; Slavin, 1996). Teachers need to use instructional strategies that have proven effectiveness in order to embed evidence-based teaching strategies into the culture and everyday practice of schools and thereby optimize outcomes for all students (Hornby, Gable & Evans, 2013).

In order to be optimally effective, teachers need to use strategies for which rigorous research evidence of effectiveness has been established, such as with interventions like formative assessment (Hattie & Timperley, 2007; Slavin, 1995). This means that teachers need to use mainly evidence-based strategies, which have been defined by Cook and Odom (2013, p.136) as, 'practices and programs shown by high quality research to have meaningful effects on student outcomes'.

In addition to identifying and implementing evidence-based practices, teachers need to be able to recognize and avoid interventions that are not evidence-based, but are popular in schools, such as ability grouping, use of colored overlays, growth mindset, or learning styles (Hornby, Atkinson & Howard, 1997; Jacobson, Foxx & Mulick, 2005; Pashler, McDaniel, Rohrer & Bjork, 2009). Educational psychologists have an important role to play in helping teachers to identify and evaluate strategies, interventions, and programs in terms of the adequacy of their research evidence, so that they can select those that are evidence-based and avoid those that are not. Once key evidence-based teaching strategies are identified educational psychologists have the knowledge and skills to work with teachers to help them overcome the various barriers to implementation of these strategies in their classrooms (Hornby, Gable & Evans, 2013).

In the past three decades, there has been an exponential increase in research evidence collected on the effectiveness of interventions and programs used in the field of education. What many experts in the field bemoan is that this has largely *not* been translated into day-to-day practice in schools. That is, despite having clear evidence for the effectiveness of some strategies, but not others, this has not resulted in widespread changes to the educational practice of teachers (Burns & Ysseldyke, 2009; Cook, Tankersley & Landrum, 2016; Gorard, See & Siddiqui, 2017). It seems clear that simply making this information available to teachers, principals and teacher educators is not resulting in widespread use of evidence-based practices (Hornby, Gable & Evans, 2013). This is where the training and expertise of educational psychologists can be invaluable in providing training and support for teachers in implementing evidence-based teaching strategies and in ensuring that these strategies are embedded in the day-to-day practice of schools.

However, having a strong base in research evidence is not the only consideration when selecting instructional strategies. Educational strategies also need to be implemented within the current context and practical realities of schools and classrooms. They are highly dependent on professional wisdom built on extensive teaching experience (Cook & Cook, 2011). Educational interventions also need to be culturally appropriate and fit with parents' and teachers' values, knowledge, skills and experience, and those of families and communities, as explained by Hornby and Greaves (2022).

Schlosser and Sigafoos stated (2008, p.61), "Evidence-based practice is commonly understood to be the integration of the best and most current research evidence with clinical expertise and relevant stakeholder perspectives." Thus, the effective implementation of evidence-based practices occurs at the convergence of extensive research evidence of meaningful change, relevant teacher wisdom and skills, and consistency with school and community cultures. So it is important for educational psychologists to work with teacher and parent communities to establish school cultures that are open to and supportive of the effective implementation of evidence-based practices (Hornby & Greaves, 2022).

2. Sources of Evidence-Based Practice

The most useful sources of information on the evidence bases reporting the effectiveness of educational strategies and interventions are large-scale syntheses and meta-analyses of research studies, such as those by *Hattie* (2009), the *Teaching and Learning Toolkit*, the *Best Evidence Encyclopedia*, and the *What Works Clearinghouse*. By helping teachers to search these sources educational psychologists can assist them to distinguish between strategies that are supported by research evidence and those that are not.

The best known and easiest for teachers to access is Hattie's synthesis of meta-analyses (Hattie, 2009). Hattie uses effect sizes as a measure of the impact of interventions and compares these with the average overall effect size of 0.4 that he found for all the interventions in his synthesis of meta-analyses. He considers interventions with effect sizes above 0.4 to

have a substantial impact and therefore to be evidence-based practices. It is for these reasons that this article refers mainly to data from this source.

However, a review and analysis of the four major sources of evidence-based teaching practices has revealed that there is a consistent consensus for the effectiveness of eight interventions that teachers can directly implement in their classrooms. These eight interventions were selected because they are considered to be key evidence-based strategies for improving student outcomes that teachers at all levels of education systems can implement themselves and therefore benefit from learning how to use effectively. They are, *teacher-student rapport, formative assessment, cooperative learning, peer tutoring, direct instruction, metacognitive strategies, functional behavioral analysis, and parental involvement*.

Developing *teacher-student rapport* is an essential pre-cursor to facilitating optimal learning, while use of *formative assessment* enables teachers to identify students' strengths and needs and to plan their teaching to address these. *Direct instruction* provides a guide to teachers in the steps needed for effective teaching, and teaching *metacognitive strategies* helps students to learn more effectively. Implementing *peer tutoring* strategies helps students to learn together in order to maximize their achievements and *cooperative learning* strategies facilitate their social and academic learning. *Functional behavior analysis* facilitates the management of student behavior and helps prevent classroom disruption, and, teachers supporting *parental involvement* both at school and in the home produces optimal academic and social outcomes.

In this article brief accounts of the theoretical and research evidence bases for each of the eight key evidence-based strategies are presented, along with selected video examples of their use in either early childhood, elementary school or high school classrooms in order to provide guidelines for their use. Brief summaries of the theory and research supporting each of the eight key evidence-based strategies are presented below along with the titles of video exemplars illustrating their use in classrooms. The order of presentation does not indicate any hierarchy of importance.

2.1 Teacher-Student Rapport

The relationships which teachers establish with individual students and groups of students in classrooms is a critical element in the effectiveness of their teaching. (Hattie, 2009) reported that the effect size for teacher-student relationships was 0.72, which is a well above the average overall effect size of 0.4 that he found for all the interventions in his synthesis of meta-analyses. This indicates that establishing teacher–student rapport is a strong evidence-based practice. A key aspect of establishing teacher–student rapport is active listening, which involves teachers actively engaging in clarifying the thoughts and feelings of students. The process of active listening is a key component of effective interpersonal skills and involves reflecting both thoughts and feelings back to students so that their specific feelings and the reasons for those feelings are explored. An excellent video example of the use of active listening was portrayed in a popular TV show and is entitled, *Everybody Loves Raymond Uses Active Listening - from Parent Effectiveness Training*. This video demonstrates the impact on a young child of a parent using active listening in order to engage the child and gain her cooperation.

2.2 Formative Assessment

Whereas most assessments in schools are summative assessments used to measure the knowledge and skills that students have acquired over time, in formative assessment the focus is on where the student currently is, where they are going, and how they are going to get there (Wiliam, 2017). Formative assessment typically involves gathering evidence through a variety of student work products that provide the substance for reflective feedback, which is a critical aspect of formative assessment. Formative assessment elicits this feedback to prompt further teaching and guide learning steps. Formative assessment has been found to result in an average effect size of 0.90, which is well above the average effect size of 0.4, which indicates that formative assessment incorporating feedback is an evidence-based practice and an invaluable aspect of the teaching process (Hattie, 2009). The brief video, *Formative assessment in the classroom*, demonstrates how teachers in an Australian school share formative assessment information with their students as they seek to involve them in the learning process.

2.3 Cooperative Learning

Cooperative learning involves the use of small groups

in which students work together to maximize their own and each other's learning (Johnson & Johnson, 1991). Cooperative learning has been found to be one of the most effective class-wide interventions in education, with an average effect size of 0.59 compared with individual learning, and for the Jigsaw method an effect size of 1.2, which is well above the average (Hattie, 2009). Cooperative learning includes a wide range of different intervention strategies, including: 'Think-Pair-Share', 'Jigsaw', 'Student Teams Achievement Divisions'; 'Numbered Heads Together'; and 'Group Investigation', which each have extensive research evidence supporting their effectiveness. They are used in classrooms with a wide range of age groups and in a variety of curriculum areas, which indicates that cooperative learning provides a wide range of strategies that facilitate optimum learning outcomes and is therefore considered a key evidence-based teaching strategy (Slavin, 1995). This is illustrated by the video, entitled, *Kagan Cooperative Learning-Structures for Success Part 1*. This shows teachers and students in American classrooms using and reflecting on a structural approach to cooperative learning which they report increases the engagement, enjoyment and achievement levels of the students.

2.4 Peer Tutoring

Peer tutoring provides opportunities for students to work with a peer partner to engage in roles where one serves as the tutor and the other the tutee. When students are guided to work in partnership, helping each other organize and process information, their opportunities for improved learning are increased. Allowing students to engage in peer tutoring supports their learning by allowing them time to develop their understanding as they share their knowledge and skills. In addition, peer tutoring interactions are found to yield positive effects for both the tutor and the tutee (Hattie & Zierer, 2017). Hattie (2009) found that the influence of peer tutoring on students' academic performance has an overall positive effect size of 0.51, meaning that peer tutoring is considered to be an evidence-based teaching strategy. An example is provided by the video entitled, *PALS High School: Partner reading*, which demonstrates how peers assist each other with word decoding and actively listen as their partner retells what they have read.

2.5 Direct Instruction

Direct Instruction (DI) helps students participate in instruction with extensive guided practice and opportunities for meaningful review and feedback to refine their understanding as they develop independent skills. DI supports effective teaching and includes a specific education plan and a practical teaching model to follow. It emphasizes teacher-directed instruction with time for students to engage in repeated practice until they become independent with specific skills. DI has been found to have an overall average effect size of 0.59 (Hattie, 2009), suggesting that this approach substantially improves student learning, so is an evidence-based strategy. Reading Recovery is an example of an evidence-based practice embodying DI methodology that provides tutoring to the lowest achieving children who struggle with reading and writing after their first year at school. The program is supplementary to mainstream classroom literacy instruction and aims to foster the development of reading and writing strategies by tailoring individualized lessons to each student's needs. Teaching strategies used at each of the program's four phases are tightly specified (Holliman & Hurry, 2013). Some of these strategies are illustrated in the following video, from a school in England, which is entitled, *Key Stage 1/2 English, Episode 2: Reading Recovery: One-to-One*. This demonstrates how the DI approach can be integrated with a child-centred approach to learning.

2.6 Metacognitive Strategies

Metacognitive strategies are techniques used to help students understand the way they learn and do this more effectively (Hornby, 2014). Metacognitive strategy training involves explicitly teaching and coaching students in the skills that will allow them to improve their learning. The overall average effect size for metacognitive strategies is reported by Hattie (2009) to be 0.60. This is an above-average effect size for educational interventions, clearly demonstrating its potential for improving levels of academic achievement, and confirming that it is an evidence-based practice. An example of a metacognitive strategy is concept or semantic mapping. Concept mapping is beneficial at the start of a lesson to set out the concepts and vocabulary involved in the subject to be taught. In the following video entitled, *How to make a concept*

map, a teacher in the USA demonstrates how to develop a concept map by first starting with the central concept, in this case, the solar system. This method portrays the components of the solar system using a visual representation of information that is designed to encourage thinking while also creating a tool to support understanding.

2.7 Functional Behavioral Analysis

Functional behavioral analysis is an intervention that is used to address behaviors that impede students' learning and interfere with classroom learning environments. In addition, behavior management systems, based on Functional Behavior Assessment (FBA), have been demonstrated to positively impact student academic success, with an effect size of 0.52 (Hattie & Zierer, 2017), indicating that FBA is an evidence-based teaching strategy. One such system is Positive Behavioral Interventions and Supports (PBIS), which is explained in the video made by a clinical social worker in the USA who provides training to schools and is entitled, *What is PBIS? 5 minute description and 4 main components*. PBIS and other systems of behavioral intervention typically have three tiers which represent a continuum of behavioral and academic supports. Tier 1 supports are focused on addressing school-wide behavioral expectations. Tier 2 supports are more targeted and address small groups of students with problem behaviors that do not respond to universal approaches. Conducting a Functional Behavior Assessment is a more intensive Tier 3 approach that addresses individual cases that remain unresponsive.

2.8 Parental Involvement

Parental engagement and parental involvement are terms used to refer to the involvement of parents with their children's education both at school and at home and have been found to provide effective strategies for improving educational achievement (Hornby, 2011). Hattie (2009) found the effect size for parental involvement to be 0.51 for schools overall, which indicates that parental involvement from early childhood through to high school levels is an evidence-based practice based on extensive research. An example of this is provided by the video entitled, *Leading parental engagement initiatives*, which shows how teachers at a school in Australia involved parents in developing a whole-school policy for parent engagement.

3. Conclusion

Effective teaching and improved student outcomes will result when evidence-based teaching strategies are widely used in classrooms. The important role of educational psychologists in helping teachers identify and implement evidence-based teaching strategies and avoiding approaches that are not evidence-based, but may be popular in schools, were discussed. Eight key evidence-based teaching strategies were identified supplemented by links to videos demonstrating their use in real-life classrooms.

While only brief details was able to be provided here, comprehensive theory and research evidence supporting each of the strategies is available from the book *Essential evidence-based teaching strategies* (Hornby & Greaves, 2022). This book provides the titles of and live links to videos that illustrate the use of each of the key strategies in real-life classrooms from countries around the world. The videos can be played by pasting their italicized titles into google. It is intended that seeing the strategies in action in real-life settings will assist teachers in implementing these in their own classrooms and encourage them to help their colleagues to do the same, thereby helping to embed evidence-based teaching strategies into the culture and everyday practice of schools.

This provides educational psychologists with the information and resources to work with teachers at all levels of education systems to learn about and implement these key evidence-based teaching strategies in their own classrooms and encourage them to share these with colleagues in order to help ensure that the use of evidence-based teaching strategies is embedded in the culture of their schools. The need for educational psychologists to work with teacher and parent communities to establish school cultures that are open to the implementation of evidence-based practices is noted. In these ways educational psychologists can help ensure that the use of evidence-based teaching strategies is embedded in the culture of schools and thereby have maximum impact on improving student outcomes.

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Conflict of Interest

There is no conflict of interest.