Merging lesson study and response to intervention

Camilla Nilvius
Department of Pedagogy and Learning, Linnaeus University, Vaxjo, Sweden

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Abstract

Purpose – This article theoretically analyzes how response to intervention (RTI) can be used as a tool in lesson study (LS) to enhance student learning and how RTI can be made more user-friendly by teachers in LS. The focus is on how RTI can be adapted to teachers' daily work by including it in the LS model and how LS can benefit by introducing a scientific approach in analyzing student learning outcomes through RTI. The article also highlights how this approach can contribute to learning for children with special educational needs (SEN).

Design/methodology/approach – This theoretical paper describes and compares the characteristics of the LS model with the RTI framework. The comparison highlights the design of models related to teachers' development and learning outcomes. The benefits and challenges with the models are described. A previous research study related to the models is also briefly reviewed.

Findings – There are benefits and challenges with both the RTI and LS models but parts of the models appear to complement one another to some extent. Teachers' professional development and a better control of learning outcomes could be gained by combining the models. This could also lead to educational improvement.

Originality/value – There has been almost no research about a combined LS and RTI model.

Keywords Comparative study, Response to intervention, Lesson study, Professional development, Interventions, Learning outcomes

Paper type Research paper

Bridging teacher development and student learning

Lesson study (LS) builds on a strong collaborative approach among teachers – sometimes also in collaboration with researchers. Hitherto, the focus has mainly been on teachers' development and their understanding of student learning. This process has been variously observed through classroom observations or "case students"; however, it has not commonly been examined in terms of the learning development of all students (Hiebert and Morris, 2012). Elliott (2019) describes good action-research as the development of an experimental approach in a sustainable form of teaching as one among other characteristics. He suggests that learning content should be handled in light of variation theory using triangulation in data collection. However, to systematically monitor all students' learning and development over time (and perhaps prevent students from acquiring learning difficulties), it would appear important to implement additional follow-up systems. The present article acts as a bridge between strong collaborative teacher development and the monitoring of all students' learning development by conducting a theoretical analysis of response to intervention (RTI) used as a tool within model LS. The intention is to find a model to identify students "at risk" and prevent future learning difficulties.

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It has unfortunately long been known that teachers cannot rely on their education and knowledge of learning to provide sufficient instruction and support to all students – especially for students with special educational needs (SEN) (Bjorn *et al.*, 2018). This is an argument for the importance of teachers continuing to receive professional development support after finishing their education. In Japan, this has historically been systematized through LS (Fernandez, 2004). It is clear that not all students around the world succeed in school. International assessments of student learning outcomes, such as the Program for International Student Assessment (PISA), have demonstrated this in repeated examinations (Schleicher, 2019). To provide evidence about the best policies and practices in education, the Organization for Economic Co-operation and Development (OECD) produces the triennial PISA report on the global state of education. The PISA describes students' results in terms of eight levels of performance. Level 1 is the lowest-performing level. Only 77% of students in OECD countries attained level 2 proficiency in reading; however, in China, Estonia and Singapore 90% reached that level (Schleicher, 2019). The report indicated that no country in the world achieved 100% success in reading mathematics or science. Such reports as the PISA tend to analyze socially and economically disadvantaged students. However, practitioners working in schools around the world know that some students struggle with learning, i.e. SEN students (Florian, 2012). For such students, the quality of education is even more important than for other students; with improved education, it is possible to enhance the outcome for SEN students (Phillips and Meloy, 2012; Villanueva and Hand, 2011). Many teachers have difficulties in finding strategies that facilitate learning for SEN students. Therefore, the risk of educational failure increases for some of their students (Luís de Miranda and Andréa, 2012). For students with special needs, it is essential to consider processes that allow them to receive appropriate education, which should take into account student characteristics, abilities and needs as well as monitoring the student learning development.

Students with special needs

SEN students are those with learning, physical or developmental disabilities; there can be behavioral, emotional and communication disorders, as well as learning difficulties (Kryszewska, 2017). SEN has a long history. It has endured many transformations over the years and been given different names. Nowadays, the term "SEN students" refers to teaching learners that fall behind in their education compared with their peers. Children who are just economically or culturally disadvantaged are not regarded as SEN students. Students are considered to have SEN if they have significantly greater difficulties in learning than most students of the same age and special educational provision has to be made (Kryszewska, 2017).

In Article 24 of the Convention on the Rights of Persons with Disabilities of 2006, inclusive education aims to provide effective individualized support in environments "that maximize academic and social development, consistent with the goal of full inclusion" (United Nations, 2006). Over recent decades, worldwide educational policies concerning the education of SEN students have shifted toward inclusive education. The concept of inclusion for students with special needs in general education has produced changes, such as modifications in structure, pedagogy and teaching, as well as the roles of teachers and other educational professionals in education systems (Eisenman *et al.*, 2010; Robinson, 2017).

Around the world, countries, school systems, policy makers, stakeholders, researchers and practitioners have different approaches to the problem that not all children succeed. To better address students' learning needs, the focus is sometimes set on teachers' abilities to improve their practice. Examples of this are collaborative models, such as LS and learning study, where the emphasis is on learning through cooperation (Holmqvist, 2017). Conversely, the focus can be directed toward frameworks for early identification of students at risk of

developing learning difficulties and providing instructions for intensifying tiers of support. An example here is the multi-tiered framework RTI (Denton *et al.*, 2012; Fuchs and Fuchs, 2006).

Response to intervention

RTI is an educational approach designed to provide effective interventions for struggling students (Denton *et al.*, 2012). It originated in the USA with the No Child Left Behind initiative, which was introduced in the early 2000s. RTI was later introduced as a policy in that country in the context of special education through the reauthorization of the Individuals with Disabilities Education Act. The basic idea of RTI is to make an early identification of struggling students toward offering adequate support before failure occurs (Denton *et al.*, 2012). Thus, RTI can be described as proactive and preventative. It is in contrast to an educational approach, where students fail before measures and support are put in place: the "wait-to-fail" model. RTI is often referred to as a tiered model of academic and behavioral support (Fuchs and Fuchs, 2006). There is, however, no single, universal definition of RTI (Denton *et al.*, 2012). RTI is usually characterized by systematic, repeated assessments of basic skills and by monitoring data to determine students' RTIs in all tiers (Fuchs and Fuchs, 2017). In RTI, there are usually three tiers (Denton *et al.*, 2012). Tier 1 consists of evidence-based teaching for all pupils in classroom-based activities. Students receive the core curriculum and differentiated instructions. Universal screenings are used to identify students at risk. Students who do not develop adequate skills receive more intensive, individualized efforts and learn in smaller groups. That corresponds to tier 2 in the model. Tier 2 entails supplemental support to the core curriculum; it is often delivered to small groups of students for a limited duration. The teacher (often a special needs teacher) holds a lesson for a small group of students within or outside the regular classroom setting. The intention with tier 2 is to close the gap between current and expected performance. Tier 3 consists of even more individualized, intensive efforts. The intervention is often provided to even smaller groups or used in one-to-one tutoring. The time for intervention is 45–60 min daily. Tier 3 teaching is provided by specialized teachers and progress is monitored weekly or every other week (see Figure 1); (Denton *et al.*, 2012).

A student's movement between tiers is based on their performance during screening as well as on continuous monitoring and measuring of progress. In literacy, it is possible to assess fluency of letter name, initial sounds, phoneme segmentation, oral reading, nonsense word and word identification and comprehension (Compton *et al.*, 2012; Denton *et al.*, 2012; Gilbert *et al.*, 2012). In mathematics, it can be early numeracy, mathematical ability, number

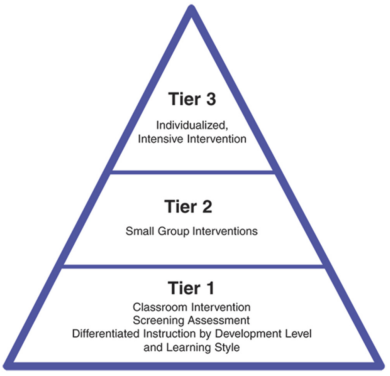

Figure 1.
The response to intervention model (Moving with Math, n.d)

sense and whole-number understanding (Clarke *et al.*, 2016). In this context, RTI is a multifaceted school improvement initiative; it is aimed at maximizing the achievement of all students by closely monitoring their response to instruction. The monitoring of results is used to adjust instructional approaches as the students progress (Fuchs and Fuchs, 2006). Denton *et al.* (2012) argued that as a multi-tiered model of prevention and intervention, RTI benefits at-risk learners. In that way, the RTI approach builds upon data-driven decision-making and implements evidenced-based interventions to improve educational outcomes. Denton *et al.* also highlighted the importance of teacher professional development in an RTI context. The teacher plays a key role in ensuring high-quality instruction at all tiers. Instructions should be delivered in accordance with evidence-based, empirically validated programs and processes (Denton *et al.*, 2012). It has been shown that it can be difficult to implement and sustain the RTI framework in schools (Burns *et al.*, 2013).

Some researchers have emphasized RTI as a possible model for inclusion for students as well as an alternate to a more traditional special education, which is often segregated from regular teaching settings (Grosche and Volpe, 2013). However, those authors also argued that there are challenges with implanting RTI as a substitute for traditional special education. That is due to the following: a lack of implementation strategies; unclear responsibilities between special and general education teachers; time and resources for teaching students with special needs and unnecessarily labeling and stigmatization of children with special needs. After those challenges have been clarified, RTI can be developed as a concept for inclusive education (Grosche and Volpe, 2013).

Since the beginning of this century, syntheses, reviews and meta-analyses have examined the efficiency of interventions within the RTI model. One meta-analysis (Burns *et al.*, 2005) suggested that interventions within that model improved students' outcomes compared with control groups: the effect sizes varied from $d = 1.02$ to 1.54. Those authors also reported that the proportion of children identified as having learning disabilities with RTI models was reduced to 2% compared with 5% in annual school reports. A synthesis of 18 published studies in reading interventions for students with reading difficulties and disabilities found positive outcomes for students participating in extensive interventions, i.e. tier 3 (Wanzek and Vaughn, 2007). This result indicated higher effects in studies that provided early intervention (in grade K-1) and in small groups. Positive outcomes for students with reading difficulties who participated in the intervention was reported, with effect sizes ranging from $d = 0.34$ to 0.56. In a meta-analysis, Wanzek *et al.* (2016) extended their previous work (Wanzek and Vaughn, 2007; Wanzek *et al.*, 2013) on reading interventions. They investigated tier 2 interventions within RTI and found effect sizes of $d = 0.36$ and 1.02. This research demonstrating the efficiency of interventions within the RTI framework should be considered rigorous.

Many other countries have followed and implemented models inspired by RTI. Examples include The Netherlands (Scheltinga *et al.*,2010; Struiksma *et al.*, 2009), the similar variant Assess, Plan, Do, Review (APDR) introduced in England (2014) under the Special Educational Needs and Disability Code of Practice (Greenwood and Kelly, 2017). A theoretical comparison between the structure of special education since 2010 in Finland and RTI has also been presented (Bjorn *et al.*, 2018). Even if models vary across countries, the common element of a multi-tiered system and monitoring of students remains.

The efficiency of interventions within RTI is well documented; however, such areas as the lack of specificity in assessments and cutoffs for different tiers, the quality and implementation of interventions and the selection of research-based practices and fidelity have been criticized (Berkeley *et al.*, 2009). In addition, RTIs have been censured for the lack of validity and using students who failed to respond to other interventions (Kavale, 2005). Historically, RTI has also been used as a diagnostic method for learning disabilities, which has been highly controversial (Batsche *et al.*, 2006).

Lesson study

LS is an examination cycle conducted by a team of teachers (Lewis, 2011). The work is centered on a "research lesson," which is an actual classroom lesson designed to study and improve the teaching of a particular topic. Professional development is closely connected to improving lessons toward making better adjustments for students' learning.

LS teachers experience four phases of the quality circle "study-plan-conduct-reflect" (Lewis, 2011). In LS, an educational method that visualizes the students' learning outcomes is selected. Monitoring student learning can be achieved through assignments and documents in the form of checklists (Lewis, 2011). Observation protocols can also be used (Dudley, 2014). Observers collect data about how the students discuss, answer and solve problems, as well as how they seem to be thinking. As a final step in the process, the observers discuss and analyze how the students responded to the teaching and learning process, as well as how to improve and implement the lesson. Demonstrating the effectiveness of lessons demands common assessments: such assessments can ensure that changes after teaching are improvements, not just random changes; the lack of this aspect in LS has been discussed as a weakness (Hiebert and Morris, 2012).

It is unusual for student results to be reported in LS research; however, there are occasional examples of studies reporting student learning outcomes (Rahman *et al.*, 2016). Research has tended to focus on the results of teacher development and learning outcomes based on qualitative evaluations in published LS studies.

Even if versions of LS designs may vary across countries and school systems, the model always involves close collaborating teachers. In summary, LS is characterized by the following: collaborative teachers' teams; emphasis on teaching practice and lesson design and the learning processes of students within their subject. The teacher's role is closely linked to improving teaching. These features correspond to what a recent review has described as effective, evocative professionalization with the focus on quality education (Darling-Hammond *et al.*, 2009). However, placing the stress on teacher development and student group learning –instead of monitoring all students' progress – could mean that individual students in need of support are not identified.

Over recent decades, LS has been researched and described in various countries. Most studies have been small in scale, qualitative, inductive and explorative (Xu and Pedder, 2014). Hattie (2009) maintained that effective professional development should be set as close to practice as possible. With LS, research questions are raised in teachers' ordinary workplaces. Many small-scale qualitative studies found that LS could be efficient. However, Holmqvist (2017) concluded that such practice-based research was difficult to replicate and that the studied variables could have been difficult to control. LS has been used for professional development in Japan since the 19th century as part of continuing professional development. Groups of teachers observe other colleagues' lessons; during a post-lesson meeting, they discuss how to further develop instructions and improve teaching. The results of this collaborative work are published frequently and shared with other teachers in Japan (Holmqvist, 2017).

In their review, Ming Cheung and Yee Wong (2014) found nine studies supporting the benefits of LS as a powerful tool in helping teachers examine their practices and enhance student learning. However, different outcome measures were employed, and the study designs varied in terms of quality. Those authors argued that there is a need for further studies with validated, consistent outcome measures using approaches with randomized designs. In their systematic review, Willems and Van Den Bossche (2019) found five studies describing LS as a powerful professional development approach. They reported significant improvements among teachers in terms of knowledge, skills, behavior and beliefs. Positive experiences and evidence of the efficiency of LS have spread worldwide; however, the results often derive from small, qualitative studies. Willems and Van Den Bossche (2019) believe

there is still a lack of significant evidence and long-term research. Norwich and Ylonen (2015) stated that studies often tend to focus on describing or prescribing, rather than on methodically researching LS. They suggested that the lack of a gold standard randomized controlled trial (RCT) design is because LS is still a developing strategy, not a specific method or intervention.

Research to some extent has shown that LS or RTI can be used to efficiently deal with the problem of failing students. But there is still a strong need to develop teaching methods to enhance student learning – especially for SEN students. The present article concerns the following: how to make RTI school-friendly; how to make it more connected to teacher development and how teachers who are already working with LS can contribute to a more scientifically based analysis of student learning outcome.

One option is combining LS with the RTI framework to deal with the problem of failing students more efficiently. Only one identified study has examined such a combination and found positive results (Benedict *et al.*, 2013). The authors claimed that LS can "increase the alignment of curricula, learning goals, strategies and activities across tiers within an RTI framework" (p. 30). LS can counteract the misalignment between special needs RTI instruction (in tiers 2 and 3) and classroom instruction (tier 1). Misalignment could otherwise be confusing and create learning barriers for struggling learners (Benedict *et al.*, 2013). Another study related to this issue conducted a dynamic assessment of LS for children with special needs (Norwich and Ylonen, 2015). The researchers found that in student assessments, there was a decrease in the identification of student difficulties and increased identification of enabling factors. The authors interpreted this finding as evidence of the potential of dynamic assessment in LS.

According to Dudley (2013), LS can help teachers analyze students' different educational needs and provide them with information about how to address such needs. In recent years, there has been increased interest in using a professional development approach, such as LS, to enhance teachers' ability to adapt to their teaching to students' educational needs (Schipper *et al.*, 2017). In The Netherlands, the LS model has been implemented with a strong focus on different educational needs by applying its three-tiered planning using case students from different tiers in the LS cycle (Schipper, 2019). This approach has also been examined in Britain in the form of LS lessons planned for higher-, middle- or lower-attainment groupings (Dudley, 2013). Researchers have stated the need of teachers' professional development within the context of RTI (Denton *et al.*, 2012). Below LS and RTI are compared, a case pilot study is presented and a discussion of their combination follows.

The concluding analysis: comparison of lesson study and response to intervention

Teacher's role: LS and RTI are both orientated toward studying and improving student learning, but they adopt different perspectives. The focus in LS is collaboration among teachers to improve instruction toward increasing student learning outcomes (Lewis, 2011). The teachers' teams set goals; they then plan and conduct research lessons, which are observed, analyzed and reflected upon. By contrast, RTI is based on a framework for early identification and support of students who are at risk of developing learning difficulties (Fuchs and Fuchs, 2006). The instructions for the RTI tiers are initially based on differentiated teaching; there are more adapted instructions and increasingly intensive interventions in the tiers for students at risk. There is no teacher or educational development built into the RTI framework. The importance of the teacher is recognized (Denton *et al.*, 2012) but it is not emphasized. To summarize, the teacher's role and professional development are important and the prime focus in LS, but they are not so prominent in RTI. Unlike with LS, the individual student is in the foreground in RTI and the teaching role is more secondary. Thus, the understanding of the teacher's role differs between the two models.

Learning and instruction: In LS, a specific learning topic, chosen by the teacher, is the focus throughout the LS cycle(s) (Lewis, 2011). This means that only one small part of the curriculum, learning goals and student learning and abilities are captured in the LS process. Instructional improvement regarding the chosen subject is deeply examined, and the improvements are implemented. In RTI, the learning and instruction in the different tiers result in more intensive interventions owing to the children's needs being built into the system. The learning and interventions are often arranged toward wider abilities, such as reading (both decoding and comprehension) and mathematics. The teachers in an RTI framework are prompted to deliver interventions that have been shown to be effective in previous research (Clearinghouse, 2015).

Student learning outcome: In LS, data collection related to student learning tends to be qualitative data, such as teachers' observations; it sometimes involves checklists and protocols (Lewis, 2011). To better determine student learning, the data are merged in the reflection phase. Differentiated instructions can be implemented in lesson planning for case study students (Dudley, 2013; Schipper *et al.*, 2017); however, such cases do not represent the whole group of students that should be monitored. Monitoring over time is built into the RTI framework itself: standardized tests are often used. The outcome serves to show the efficiency of interventions for student development. Hiebert and Morris (2012) argued that information about lesson effectiveness is most useful if implementations in different classrooms can be compared. Common assessments enable such comparisons. The authors highlight the importance of developing a measurement scale. Holmqvist (2017) also found that LS research is difficult to replicate and that the studied variables may be difficult to control.

Students with SEN: LS has often been directed at general education. Little research has been conducted on LS in terms of inclusive practices and special education for SEN students. However, interest in this area has grown in recent years, and case students from different tiers have been included in LS studies (Schipper *et al.*, 2017; Dudley, 2013; Benedict *et al.*, 2013). The RTI framework was developed to prevent student failure and allow early identification of students at risk in conjunction with evidence-based, increasingly intensive interventions. At-risk students could later become SEN students. It is promising that the RTI framework has been shown to reduce the proportion of students in special education from 9% to 1.5% (Grosche and Volpe, 2013).

A small illustrative pilot case – combining collaborative problem-solving teachers and response to intervention

A small pilot case study sought to find out how a RTI model combined with collaborative problem-solving teachers (here called focus groups) could work as a method of early identification, monitoring and intervention with 11 grade 2 students in basic skills over a year. Repeated meetings of three collaborative teachers and a researcher, approximately once a month, and RTI-interventions in different tiers constituted a kind of an explanatory sequential intervention design (Creswell, 2015); (Figure 2).

Quantitative data were collected with tests of basic skills in reading and math (for example, letter knowledge, decoding ability and foundational number sense) before, during and after the tiers of intervention. Standardized tests were used to monitor students' development. A cutoff at the 30th percentile was set to determine if a student still was in need of intervention. The collaborative meetings involved an analysis of all 11 students' outcomes from tests in math and reading and adjustment of the interventions according to the students' needs. By the end of the year, all students met the cutoff criteria or higher in math and only two of the 11 students were still in need of intensive tier 3 interventions in reading. Qualitative results, including field notes from the collaborative meetings, indicated that RTIs worked

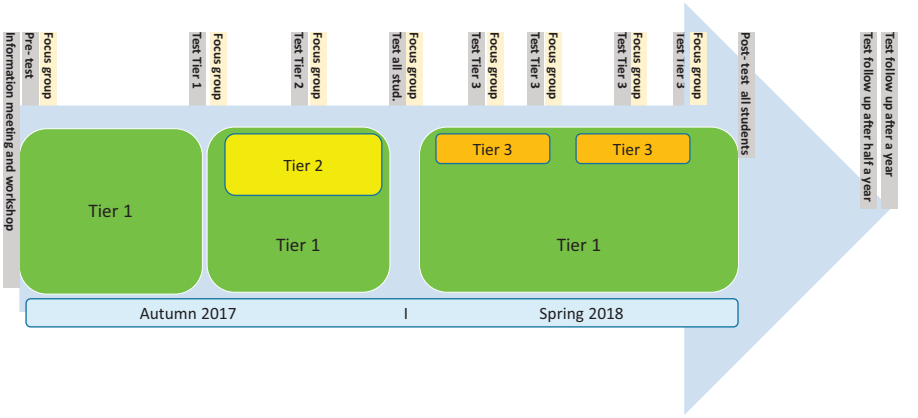

Figure 2.
The design of the pilot case study

very well. The data indicated that the teachers analyzed all students' test outcomes and discussed further methods and materials to be used in upcoming interventions. The teachers reveal that a benefit of the RTI model is the intensive and well-adjusted interventions that are specific to students' needs and quickly implemented when needed. The teachers also claim that the RTI model gave them good control over all the students' development in basic skills and that monitoring all students' development was important to better understand their needs. Teachers also report that the collaborative meetings, analyzing students' outcomes from tests made them more aware of what they needed to develop in their teaching, in order to meet students' varying needs. Recurring collaborative meetings were important according to the teachers. Finally, teachers believed it can be perceived as resource demanding to practice intensely on basic skills in intensive interventions in early school years but they argue it is well-invested time against the larger costs of long-term failure.

Discussion

Combining LS and RTI could allow the strengths and weaknesses of the two models to complement one another. The RTI framework could contribute to ensure that no child is left behind: all children are monitored and will receive increasingly intensive interventions until they respond. This does not only occur as in a LS cycle on a specific topic: it takes place over several school years, giving a wider approach to the development of a student's reading or mathematical ability. This approach could reduce the number of students who would have to be referred to special education. However, there would still be students in need of tier 2 and 3 interventions. LS could then contribute by closing the gap between different levels of tier interventions: research has shown that this is a possibility with the combined use of LS (Benedict *et al.*, 2013). However, it is important, as noted by Hattie (2009), that effective professional development should be set as close to practice as possible.

Denton *et al.* (2012) argued the importance of teachers' professional development in an RTI context and LS could be the way to meet this need. It has been demonstrated that LS can enhance teachers' abilities, leading to more adaptive teaching and improved instruction (Schipper, 2019). It has sometimes been argued that the scientific basis of LS still lacks significant evidence (Willems and Van Den Bossche, 2019). A study using scientifically robust RTI interventions could reinforce the evidence-based practice of combined RTI and LS. Monitoring in the RTI model is often conducted using standardized tests. If standardized tests were used more often – together with the qualitative data collection that has been shown

to be effective for LS – some benefits could arise. Practices and interventions could eventually become easier to evaluate and compare. The more qualitative approach to data collection with LS appears to be something that is missing in the RTI framework. The LS qualitative data analysis could deepen the RTI monitoring process: information about student thinking and learning would be included.

One problem that could arise by combining the models (and would need to be addressed) is the different approaches in the models regarding the areas of emphasis: preventing student failure using a framework (RTI) or developing teaching and instruction (LS). The differences between the models regarding time and content also need to be considered. LS examines a smaller topic in one or a few cycles; it differs from the RTI approach, where a wider range of abilities is monitored over time. Those differences could present challenges when combining the models. Despite these issues, future research should examine this combination. It is well known that implementations of new ideas or models, as part of school development, often come with challenges; both RTI and LS research report difficulties in maintaining sustainability after implementation (Ball and Trammell, 2011; Burns *et al.*, 2013; Zhang, 2015). As with all new ideas to be implemented in organizations, such as the school, a merged RTI and LS model may encounter such difficulties. Of course, when implementing a combined LS and RTI model, these challenges would need to be considered.

Pedagogical implications

Even though little research has been conducted so far, teachers could try combining the RTI and LS models in their daily practice. The research basis for each model should be considered sufficient, if not comprehensive. LS provides increased possibilities to enhance teacher development and knowledge; RTI secures the monitoring of individual student development over a period of years. The RTI model could also prevent student failure as increasingly intensive, scientifically robust interventions are conducted. Combining the models could reveal a synergy, where the effect is greater than if the models were used separately.Further reading

References

Ball, C. and Trammell, B. (2011), "Response-to-intervention in high-risk preschools: critical issues for implementation", *Psychology in the Schools*, Vol. 48 No. 5, pp. 502-512.

Batsche, G.M., Kavale, K.A. and Kovaleski, J.F. (2006), "Competing views: a dialogue on response to intervention", *Assessment for Effective Intervention*, Vol. 32, pp. 6-19.

Benedict, A.E., Park, Y., Brownell, M.T., Lauterbach, A.A. and Kiely, M.T. (2013), "Using lesson study to align elementary literacy instruction within the RTI framework", *Teaching Exceptional Children*, Vol. 45, pp. 22-30.

Berkeley, S., Bender, W.N., Peaster, L.G. and Saunders, L. (2009), "Implementation of response to intervention: a snapshot of progress", *Journal of Learning Disabilities,* Vol. 42, pp. 85-95.

Bjorn, P.M., Aro, M., Koponen, T., Fuchs, L.S. and Fuchs, D. (2018), "Response-to-intervention in Finland and the United States: mathematics learning support as an example", *Frontiers in Psychology*, Vol. 9, p. 800.

Burns, M.K., Appleton, J.J. and Stehouwer, J.D. (2005), "Meta-analytic review of responsiveness-to-intervention research: examining field-based and research-implemented models", *Journal of Psychoeducational Assessment*, Vol. 23, pp. 381-94.

Burns, M.K., Egan, A.M., Kunkel, A.K., McComas, J., Peterson, M.M., Rahn, N.L. and Wilson, J. (2013), "Training for generalization and maintenance in RtI implementation: front-loading for sustainability", *Learning Disabilities Research and Practice*, Vol. 28, pp. 81-8.

Clarke, B., Doabler, C., Smolkowski, K., Kurtz Nelson, E., Fien, H., Baker, S.K. and Kosty, D. (2016), "Testing the immediate and long-term efficacy of a tier 2 kindergarten mathematics intervention", *Journal of Research on Educational Effectiveness*, Vol. 9, pp. 607-34.

Clearinghouse, W.W. (2015), "Best practice for RTI: intensive, systematic instruction for some students (tier 2)", Retrieved from Reading rockets Website available at: http://www. readingrockets. org/article/best-practice-rti-intensive-systematic-instructionsome-students-tier-2.

Compton, D.L., Gilbert, J.K., Jenkins, J.R., Fuchs, D., Fuchs, L.S., Cho, E., Barquero, L.A. and Bouton, B. (2012), "Accelerating chronically unresponsive children to tier 3 instruction: what level of data is necessary to ensure selection accuracy?", *Journal of Learning Disabilities,* Vol. 45, pp. 204-216.

Creswell, J.W. (2015), *A Concise Introduction to Mixed Methods Research*, SAGE, Los Angeles.

Darling-Hammond, L., Wei, R.C., Andree, A., Richardson, N. and Orphanos, S. (2009), "State of the profession: study measures status of professional development", *Journal of Staff Development*, Vol. 30 No. 2, pp. 42-44.

Denton, C.A., Vaughn, S. and Fuchs, L.S. (2012), "Response to intervention for reading difficulties in the primary grades: some answers and lingering questions", *Journal of Learning Disabilities*, Vol. 45 No. 3, pp. 232-243.

Dudley, P. (2013), "Teacher learning in Lesson Study: what interaction-level discourse analysis revealed about how teachers utilised imagination, tacit knowledge of teaching and fresh evidence of pupils learning, to develop practice knowledge and so enhance their pupils' learning", *Teaching and Teacher Education*, Vol. 34, pp. 107-121.

Dudley, P. (2014), *Lesson Study: A handbook*, available at: http://lessonstudy.co.uk/wp-content/uploads/2012/03/new-handbook-revisedMay14.pdf.

Eisenman, L.T., Pleet, A.M., Wandry, D. and McGinley, V. (2010), "Voices of special education teachers in an inclusive high school: redefining responsibilities", *Remedial and Special Education*, Vol. 32, pp. 91-104.

Elliott, J. (2019), "Quality criteria for lesson and learning studies as forms of action research", *International Journal for Lesson and Learning Studies*, Vol. 9 No. 1, pp. 11-17.

Fernandez, C. (2004), *Lesson Study: A Japanese Approach to Improving Mathematics Teaching and Learning*, Mahwah, NJ, Lawrence Erlbaum.

Florian, L. (2012), "Preparing teachers to work in inclusive classrooms: key lessons for the professional development of teacher educators from Scotland's inclusive practice project", *Journal of Teacher Education*, Vol. 63, pp. 275-85.

Fuchs, D. and Fuchs, L.S. (2006), "Introduction to response to intervention: what, why, and how valid is it?", *Reading Research Quarterly*, Vol. 41, pp. 93-9.

Fuchs, D. and Fuchs, L.S. (2017), "Critique of the national evaluation of response to intervention: a case for simpler frameworks", *Exceptional Children*, Vol. 83, pp. 255-68.

Gilbert, J.K., Compton, D.L., Fuchs, D. and Fuchs, L.S. (2012), "Early screening for risk of reading disabilities: recommendations for a four-step screening system", *Assessment for Effective Intervention*, Vol. 38, pp. 6-14.

Greenwood, J. and Kelly, C. (2017), "Implementing cycles of Assess, Plan, Do, Review: a literature review of practitioner perspectives", *British Journal of Special Education*, Vol. 44 No. 4, pp. 394-410.

Grosche, M. and Volpe, R.J. (2013), "Response-to-intervention (RTI) as a model to facilitate inclusion for students with learning and behaviour problems", *European Journal of Special Needs Education,* Vol. 28, pp. 1-16.

Hattie, J. (2009), *Visible Learning a Synthesis of over 800 Meta-Analyses Relating to Achievement*, Routledge, London, New York.

Hiebert, J. and Morris, A.K. (2012), "Teaching, rather than teachers, as a path toward improving classroom instruction", *Journal of Teacher Education,* Vol. 63, pp. 92-102.

Holmqvist, M. (2017), "Models for collaborative professional development for teachers in mathematics", *International Journal for Lesson and Learning Studies*, Vol. 6 No. 3, pp. 190-201.

Kavale, K.A. (2005), "Identifying specific learning disability: is responsiveness to intervention the answer?", *Journal of Learning Disabilities*, Vol. 38, pp. 553-62.

Kryszewska, H. (2017), "Teaching students with special needs in inclusive classrooms - special Educational Needs", *Elt Journal*, Vol. 71 No. 4, pp. 525-528.

Lewis, C.C. (2011), *Lesson Study Step by Step: How Teacher Learning Communities Improve Instruction*, Heinemann, Portsmouth, NH.

Luís de Miranda, C. and Andréa, T. (2012), "Evaluating to intervene: an educational model for students with special needs", *Revista Educação Especial*, Vol. 25, pp. 367-82.

Ming Cheung, W. and Yee Wong, W. (2014), "Does lesson study work?", *International Journal for Lesson and Learning Studies*, Vol. 3 No. 2, pp. 137-149.

Movingwithmath (n.d), "Moving with Math", available at: https://www.movingwithmath.com/learning-system/response-to-intervention/ (accessed 12 December 2019).

Norwich, B. and Ylonen, A. (2015), "A design-based trial of Lesson Study for assessment purposes: evaluating a new classroom based dynamic assessment approach", *European Journal of Special Needs Education*, Vol. 30, pp. 253-73.

Phillips, D.A. and Meloy, M.E. (2012), "High-quality school-based pre-K can boost early learning for children with special needs", *Exceptional Children*, Vol. 78, pp. 471-90.

Rahman, A., Ahmar, A. and Rusli, R. (2016), "The influence of cooperative learning models on learning outcomes based on students' learning styles", *World Transactions on Engineering and Technology Education,* Vol. 14 No. 3, pp. 425-30.

Robinson, D. (2017), "Effective inclusive teacher education for special educational needs and disabilities: some more thoughts on the way forward", *Teaching and Teacher Education*, Vol. 61, pp. 164-78.

Scheltinga, F., van Der Leij, A. and Struiksma, C. (2010), "Predictors of response to intervention of word reading fluency in Dutch", *Journal of Learning Disabilities*, Vol. 43 No. 3, pp. 212-228.

Schipper, T., Goei, S.L., De Vries, S. and Van Veen, K. (2017), "Professional growth in adaptive teaching competence as a result of lesson study", *Teaching and Teacher Education*, Vol. 68, pp. 289-303.

Schipper, T. (2019), *Teacher Professional Learning through Lesson Study: An Examination of Lesson Study in Realtion to Adaptive Teaching Competence, Teacher Self-Efficacy, and the School Context*, Rijksuniversiteit Groningen, Groningen.

Schleicher, A. (2019), "PISA 2018 insights and interpretations", available at: https://www.oecd.org/pisa/PISA%202018%20Insights%20and%20Interpretations%20FINAL%20PDF.pdf.

Struiksma, C., van Der Leij, A. and Stoel, R. (2009), "Response to fluency-oriented intervention of Dutch poor readers", *Learning and Individual Differences*, Vol. 19 No. 4, pp. 541-548.

United Nations (2006), "Convention on the rights of persons with disabilities–articles", available at: https://www.un.org/development/desa/disabilities/convention-on-the-rights-of-persons-with-disabilities/convention-on-the-rights-of-persons-with-disabilities-2.html: UN.

Villanueva, M.G. and Hand, B. (2011), "Science for all: engaging students with special needs in and about science", *Learning Disabilities Research and Practice*, Vol. 26, p. 233.

Wanzek, J. and Vaughn, S. (2007), "Research-based implications from extensive early reading interventions", *School Psychology Review*, Vol. 36, pp. 541-561.

Wanzek, J., Vaughn, S., Scammacca, N., Metz, K., Murray, C., Roberts, G. and Danielson, L. (2013), "Extensive reading interventions for students with reading difficulties after grade 3", *Educational Research*, Vol. 83 No. 2, pp. 163-195.

Wanzek, J., Vaughn, S., Scammacca, N., Gatlin, B., Walker, M.A. and Capin, P. (2016), "Meta-analyses of the effects of tier 2 type reading interventions in grades K-3", *Educational Psychology Review*, Vol. 28 No. 3, pp. 551-576.

Willems, I. and Van Den Bossche, P. (2019), "Lesson Study effectiveness for teachers' professional learning: a best evidence synthesis", *International Journal for Lesson and Learning Studies*, Vol. 8, pp. 257-71.

Xu, H. and Pedder, D. (2014), "Lesson study: an international review of the research", in *Lesson Study*, Routledge, London, pp. 29-58.

Zhang, Y. (2015), "Sustaining Lesson Study in schools with positive peer leadership", *International Journal for Lesson and Learning Studies*, Vol. 4 No. 2, pp. 140-154.

Corresponding author
Camilla Nilvius can be contacted at: camilla.nilvius@lnu.se