UNESCO Chairs / UNITWIN Networks Policy Brief Form

Under the III World Higher Education Conference (WHEC 2022)

Type: Individual ☐ | Collective ☒

TEACHER EDUCATION IN THE FRONTLINE: IMPROVING FUTURE TEACHERS' DIGITAL COMPETENCIES FOR THE ENHANCEMENT OF LEARNING OUTCOMES AND TO PROMOTE EQUALITY

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Date: 09/02/2022

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Summary

The rapid move to remote learning in 2020 caused by the COVID-19 pandemic created a challenge for all educational institutions. The pedagogy of online teaching is not usually included in teacher education, and the recent experiences of online education have revealed that many teachers have a lack of knowledge in online pedagogy and digital tools. There is also a variation in how educational institutions and personnel value the importance of digital education, with factors such as media, city or regional setting and community opinion often influencing educational decisions. Furthermore, even if teachers' digital competencies are appreciated, the availability of digital devices varies substantially between schools.

To achieve meaningful learning and improved learning outcomes through online education, future teachers need competencies in using digital tools and online pedagogical methods. In addition, they need to understand the move from web1.0 to web2.0 and the maker-culture in which the children and young people are living. Rural and Indigenous communities should have a strong presence in teacher education. Local languages and culture can be lost in English speaking online environments, and this is further hampered by expensive or limited access to the Internet. With these competencies and a critical understanding of the realities of online teaching and learning, future teachers can be equipped for their working lives in the coming decades and will be able to ensure educational equality for their students.

Content

Introduction

Online and hybrid modes of teaching and learning are becoming all the more popular in higher education, including in teacher education. However, the online pedagogical skills' development of educators has not been systematic in past years, even though the *European Framework for the Digital Competence of Educators: DigCompEdu* was published in 2017. (McGee, Windes, & Torres, 2017; Redecker, 2017). Currently many teachers lack the necessary competencies in delivering high quality technology mediated education, and there are calls for an update of national and international competence frameworks for educators (Caena & Redecker, 2019). Furthermore, according to the second Survey of Schools: ICT in Education by the European Commission (2019), education systems do not take advantage of the potentials of technology in linking formal and informal learning, and blending technology meaningfully in teaching and learning. Subsequently, this leaves the need and necessity to develop teachers' and student teachers' technical and digital pedagogical competences uncovered.

The impact of the COVID-19 pandemic on higher education made the global digital divide and inequities more visible than ever (UNESCO, 2021). As the UNESCO 2021 document reveals, lower income countries need significant infrastructure and connectivity improvements. In addition, the document clearly states that university faculties need support and guidelines in the transition to the 'new digital normal'. During the pandemic teacher educators and pre- and in-service teachers around the world mastered new digital abilities and it is highly important to maintain the momentum in order to harvest the new digital possibilities and innovations to further develop pedagogical practices (Miao et al., 2020).

The prolonged pandemic situation is going to affect and leave a mark on entire generations, highlighting teachers' frontline positions and their responsibility to educate future ready generations. Therefore, teacher educators need to develop their abilities to adapt to new digital tools and practices, and learn to interact multimodally with information that is continuously changing (Spinteri & Rundgren, 2020). This brief gives recommendations for the development and promotion of good practices in teacher education in this regard. It is vital that future teachers are educated with digital competencies, multimodal pedagogical practices and meaningful and competent use of digital technologies.

1 Technology mediated teaching and learning pedagogy in teacher education

In 2006, the European Commission defined digital competences as one of the eight key competences of the European Union citizens (European Commission, 2019). These competencies could be learned during basic and continuous education. However, teachers do not have enough competencies to provide high quality technology mediated multimodal education in an equitable way to cater for the diverse needs of their students (Caena & Redecker, 2019). Consequently, teacher education needs to be transformed to respond to the current and future needs of new digital normal education standards.

Currently the situation varies globally. For example, in Australia teachers are in general positive about using digital technology and the majority of them feel that initial teacher education has prepared them to do that (Vassallo & Warren, 2018). The *Australian Professional Standards for Teachers* includes information and communication technology (ICT) as part of *standard 2: Know the content and how to teach it* (AITSL, 2018). In Finland, these kinds of standards do not exist. However, the recent *Teaching and Learning International Survey* (TALIS) country note for Finland indicates that 51% of teachers use ICT as normal everyday practice and 56% of teachers reported that the use of ICT has been included in their

initial teacher education; here it is good to make a note that the average age of teacher in Finland is 45 meaning that probably the graduates from 1980 and at least early 1990 have not had the pedagogical use of ICT as part of their studies (OECD, 2019). Current research (Lavonen & Salmela-Aro, 2022) in Finland calls for the continuous development of the digital skills of teachers and students alike, as well as the development of digital pedagogies that encourage dialogue and enhance social interaction in online and hybrid learning (Frangou & Keskitalo, 2020; Frangou & Körkkö, 2020).

In Hong Kong, the government has made great efforts to promote the use of ICT in education, emphasizing teachers' learning within their community (Chai & Kong, 2017). The strategy during 2003/04 –2006/07 aimed to enhance the capacities of students and teachers to use IT for learning and teaching, with the provision of professional development programmes and e-learning resources to examine pedagogical and social issues, local school contexts and school as main foci (Kong et al., 2017). After that, 2007/08 – 2013/14, the strategy focused on the human factor necessary for the integration of IT into learning and teaching. Efforts were concentrated on developing an online repository with curriculum-based digital resources, to develop e-textbooks for e-learning in school education and to support school-based planning of ICT in education (Kong et al., 2014). Since 2014 the aim has been to unleash students' learning power through a series of actions, including the enhancement of Wi-Fi access in all classrooms of the public sector schools in Hong Kong in phases, enriching the quality of e-learning resources, developing new digital pedagogies and building up school leaders' and teachers' professional capacity of as well as involving parents and leveraging community resources. Currently, most Hong Kong teachers use ICT as normal everyday practice, and ICT training is now an indispensable part of teacher education programmes in Hong Kong.

However, in the United Kingdom, the situation could be described as confusing at best. In Scotland, teacher registration is managed by the General Teaching Council, and their 'Standards for Provisional Registration' make clear that a teacher's 'professional actions' must include skills and competencies around teacher digital literacy, and knowledge of how to integrate digital technology into pedagogy in order to enhance teaching and learning (GTC Scotland, 2021). Similarly in Wales, the Welsh government cites 'Literacy, numeracy and digital competence' as one of their six overarching values and dispositions that must drive all teachers (Welsh Government, 2018). However, in England, neither the well established Teachers' Standards (2011) or the recently devised and published Core Content Framework (2019) for initial teacher training make any reference whatsoever to digital learning, or competence on the part of teachers. The result of this is that each individual provider of teacher training can determine whether or not, and to what extent, they will include digital pedagogy and competence in their own training curriculum. Despite this apparent lack of digital focus in the guidance provided to schools and teachers, the national Educational Technology (EdTech) survey 2020-21 found during the pandemic that 88% of headteachers and 84% of teachers believed that technology already had, or would contribute positively to pupil attainment (DfE, 2021).

All of the aforementioned countries have high GDP per capita and can therefore invest in their education systems. In low GDP countries the situation is very different. For example, in Sub-Saharan Least Developed Countries (LDC) the COVID-19 pandemic hit their economies, and also the education sector hard, as families have taken their children out of school to support everyday living (Fuchs, 2021). However, technological learning, innovations and digitalization have been highlighted as processes with high potential to have a strong impact on LDC's

productive capacities (United Nations, 2020). In addition, building human capital in the form of education is crucial. United Nations (2020, 79) report states clearly that "quality education and training for the youth will be key in reducing the technology gap between LDCs and other developing countries". To provide quality education, teachers should hold relevant HE qualifications and enthusiasm for their work. In addition, in many LDC countries teachers' salaries do not always cover the costs of providing their families, forcing them to have an extra job.

One should also not forget how important it is to enhance the student teachers' attitudes towards ICT use in education, since their attitudes are related to the teachers' skills to use digital tools in their teaching and learning activities (Prestridge, 2012). Teachers should hence master:

- their own digital skills
- teaching digital skills
- choosing appropriate digital technology as part of teaching, and
- evaluating one's own and students' digital skills and digital tool choices (Redecker, 2017).

All in all, the significance of teachers' digital competences has become more instrumental during the Covid-19 pandemic online teaching during school closures. A study by König, Jäger-Biela and Glutsch (2020) confirmed that early career teachers' opportunities to learn digital and digital pedagogical competences during their studies were significant factors in the teachers' ability to adapt into online teaching.

2 Self-regulated online learning

Self-regulated learning is commonly expected of higher education students and also essential in online learning. It is a learning process in which the students are self-directed in three consecutive phases (Zimmerman, 1998). During the initial phase, students plan and analyse the learning activities ahead by assessing its magnitude in effort, followed by the second phase of execution and monitoring the learning process in which they use self-observation and self-control. During the third and last phase students self-reflect their learning process. Developing self-regulated learning skills can enhance the effectiveness of online learning (Carter et al., 2020).

Self-regulated learners are often high-achieving, and have the intrinsic ability to control their motivation during the learning process whilst facilitating knowledge acquisition (Chang, 2005; Ertmer, Newby, & MacDougall, 1996). Online learning contexts may require adaptive motivation from the students in order to stay focused and engaged (Park & Yun, 2018). Furthermore, Yun and Park (2020) argue that motivation regulation strategies play a critical role in learning engagement, thereby enhancing learning outcomes. However, previous research has uncovered that if students do not use digital tools for their self-regulated learning, it is due to the fact that their teachers do not require or encourage their use (Yot-Domíniguez & Marcelo, 2017).

The concept of self-regulation in the online environment requires a holistic use of online learning pedagogies combined with the use of digital resources (Broadbent, Panadero, Lodge, & de Barba, 2020) enabling opportunities for students to meet with others and their teacher to evaluate their progress. This means that university teachers need to promote self-regulated

learning. In this approach students have the opportunity to use digital technology for the entire learning process where they seek challenges, reflect on their learning progress, take responsibility of their learning and can feel pride in their learning accomplishments (Paris & Paris, 2001). In order to maintain the professional commitment of teachers in this endeavour, then solidarity, an understanding the diverse global situation, and an enthusiasm to work internationally together will provide new and exciting possibilities for teachers' professional development.

3 Recommendations and Conclusions

Technology should be used to support and enhance teaching and learning; however, it is not supposed to replace social interaction of face-to-face instruction (Keskitalo, Frangou & Chohan, 2020). Teacher education should give student teachers a firm background of the use of digital tools in education, so that they feel confident and inspired with their use in any given context and situation. In what follows, we offer four recommendations (Figure 1) for higher education providers that offer teacher education. The recommendations are not exhaustive and their objective is to be used for the establishment of goals regarding policies that ensure equality of education through the integration of technology in teacher education, irrespective of but hopefully complementary to government guidance in their home state.

In brief, teacher education and teacher educators should:

1) enhance student teachers' attitudes towards digital tool use in education
2) augment the cultural capital and value of digital pedagogies and their development in education
3) integrate meaningful and deliberate digital tool use in content delivery
4) promote multimodal use of ICTs as an inseparable and intrinsic part of teaching and learning activities

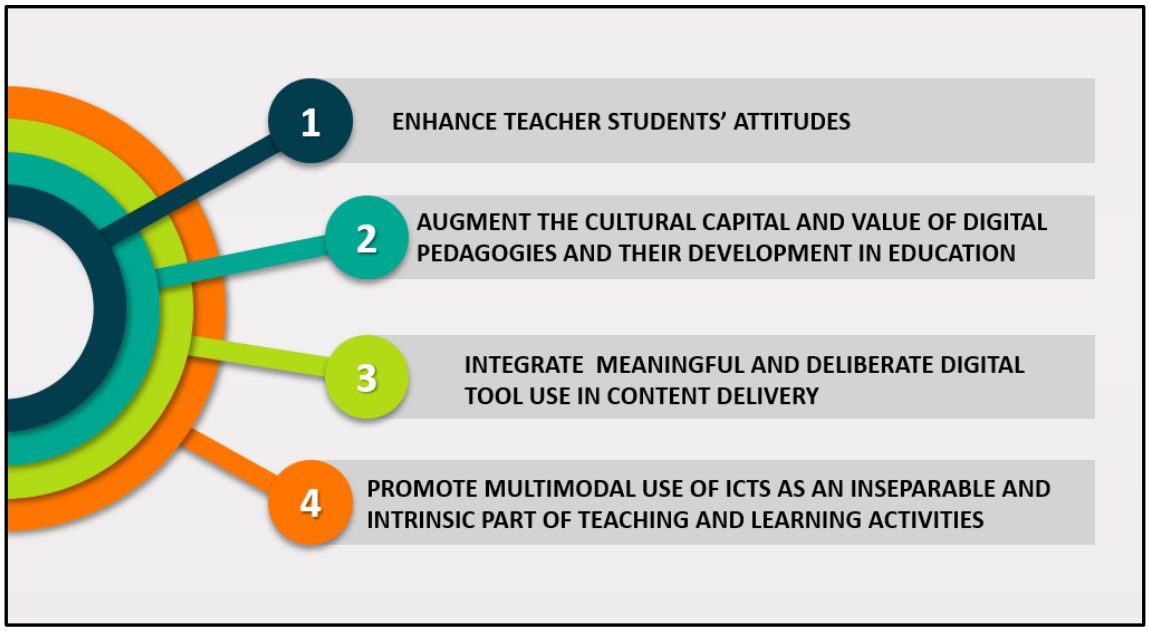

Figure 1. Recommendations

It is our contention that in order to improve the digital competencies of future teachers, in order to enhance learning outcomes and promote equality, teacher education and teacher educators should:

enhance student teachers' attitudes towards digital tool use in education. Student teachers are a product of their own educational experiences. Thus we submit that in many cases student teachers will be being introduced to digital tools for education for the first time in their lives, whilst training to teach. At best, trainees will have only experienced digital tools as learners, without any understanding of the pedagogical decisions behind their learning. If teachers are to successfully harness the learning potential of digital on the part of their own learners, then the teachers themselves must experience deliberate and meaningful digital artefacts and tools which contribute in a beneficial manner to their own learning as professionals. We envisage that that this will contribute positively in enabling the educational workforce to:

augment the cultural capital and value of digital pedagogies and their development in education. The covid pandemic has ensured that the majority of teachers have now experienced (albeit a narrow experience in many cases) utilising digital tools in their own professional practice. However, it is important that within the lexicon of education, we do not allow digital pedagogy to be seen simply as a tool of the pandemic, and an approach to education that we will mentally reject along with the covid virus, social distancing and the wearing of facemasks as we hopefully embrace the post-pandemic 'new normal.' In order for the capital of digital pedagogy to outlive the memory of the global pandemic, we must future-proof the approach by being able to:

integrate meaningful and deliberate digital tool use in content delivery. Digital tool selection must be deliberate, and have both construct and context validity with the curriculum being taught. It is vital moving forwards that confidence with a breadth of tools, and a capacity (both personal and institutional) to adapt to new tools and approaches. In a traditional classroom, a teacher with only one approach to pedagogy will soon become stale and unpopular with their learners – the same is true in the sphere of digital pedagogy. In order to therefore maintain the currency of teachers, and the motivation of learners, it is imperative that we:

promote multimodal use of ICTs as an inseparable and intrinsic part of teaching and learning activities. New teachers must be conscious of the power of digital tools for not only the contemporary but static presentation of learning opportunities, but of the inherent collaborative and imaginative potential in digital for the co-creation of new understanding and knowledge (web 2.0). Societally, many learners are active contributors to social and collaborative media, and we now need to mobilise the teaching profession to capitalise on this groundswell of digital use.

For the four recommendations to have impact, and to ensure that the education workforce can respond to both current and future needs in terms of digital pedagogy, it is clear that teacher training curricula need to be updated to respond the emerging importance of digital pedagogy, and that both higher education institutions and other training providers must both adapt to and commit to the inevitable changes in pedagogy. Further, the nature of change within the digital industries implies that in order to maintain currency, these curricula, the skills of the trainers, and the practice of educators employing digital pedagogy will continue to evolve and progress ad infinitum. This has a significant (and beneficial) impact on the

necessity to maintain the continued professional development of teachers throughout their careers.

The issue of technology integration in teacher education is not something novel, however, its necessity has become all the more apparent in the last two years. Teacher training practices and policies need to be addressed so that any future crisis in education can be avoided or at least lessened. In particular, a long-term education policy that promotes and ensures quality, equity and inclusion in education, specifically in teacher education, prepares us for any possible future challenges and societal needs (Lavonen & Salmela-Aro, 2022) contributing to the sustainability of the planet and thereby to the well-being of humans.

References

The Australian Institute for Teaching and School Leadership (AITSL). (2018). *Australian Professional Standards for Teachers*. AITSL

Broadbent, J., Panadero, E., Lodge, J. M., & de Barba, P. (2020). Technologies to enhance self-regulated learning in online and computer-mediated learning environments. In Handbook of research in educational communications and technology (pp. 37-52). Springer, Cham.

Caena, F., & Redecker, C. (2019). Aligning teacher competence frameworks to 21st century challenges: The case for the European Digital Competence Framework for Educators (Digcompedu). *European Journal of Education*, vol. 54, no.3, pp. 356-369.

Carter Jr, R.A., Rice, M., Yang, S. and Jackson, H.A. (2020), "Self-regulated learning in online learning environments: strategies for remote learning". *Information and Learning Sciences,* vol. 121, no. 5/6, pp. 321-329. https://doi.org/10.1108/ILS-04-2020-0114

Chai, C.S., & Kong, S.C. (2017). Professional learning for 21st century education. *Journal of Computers in Education*, vol. 4, no. 1, pp. 1-4.

Chang, -M.-M. (2005). Applying self-regulated learning strategies in a web-based instruction: An investigation of motivation perception. *Computer Assisted Language Learning,* vol. 18, no. 3, pp. 217–230. doi:10.1080/09588220500178939

DfE (2011). Teachers' Standards. London: Crown.

DfE (2019). ITT Core Content Framework. London: Crown.

DfE (2021). Educational Technology (EdTEch) Survey 2020-21. London: Department for Education.

Education Bureau of HKSAR. (2015). *Report on the fourth strategy on information technology in education*. (https://www.edb.gov.hk/attachment/en/edu-system/primary-secondary/applicable-to-primary-secondary/it-in-edu/ITE4_report_ENG.pdf, accessed January 2022).

Ertmer, P. A., Newby, T. J., & MacDougall, M. (1996). Students' responses and approaches to casebased instruction: The role of reflective self-regulation. *American Educational Research Journal,* vol. 33, no. 3, pp. 719-752. doi:10.3102/00028312033003719

European Commission (2019). 2nd Survey of Schools: ICT in education —Luxembourg, Publications Office of the European Union

European Commission (2019). About school policy. Education and Training. https://ec.europa.eu/education/policies/school/about-school-policy_en

Frangou, S.-M., & Keskitalo, P. (2020). Enhancing Social Learning with Digital Applications: Life Stance Education and Sámi Pedagogy Move to Synchronous Distance Learning in Teacher Education. In R.E. Ferdig, E. Baumgartner, R. Hartshorne, R. Kaplan-Rakowski, & C. Mouza (Eds.), *Teaching, Technology, and Teacher Education during the COVID-19 Pandemic: Stories from the Field*. (pp. 23-26). Association for the Advancement of Computing in Education (AACE). Available at: https://www.learntechlib.org/p/216903/.

Frangou, S.-M., & Körkkö M. (2020) Model of Technology Enhanced Affective Learning. In: Huang TC., Wu TT., Barroso J., Sandnes F.E., Martins P., Huang YM. (Eds.), Innovative Technologies and Learning. ICITL 2020. *Lecture Notes in Computer Science*, vol 12555 (pp.582-590). Springer, Cham. https://doi.org/10.1007/978-3-030-63885-6_63

Fuchs, C. (2021). Everyday life and everyday communication in coronavirus capitalism. In *Communicating COVID-19*. Emerald Publishing Limited.

GTC Scotland (2021). The standard for provisional registration. Edinburgh: GTC Scotland.

Jhurree, V. (2005). Technology integration in education in developing countries: Guidelines to policy makers. *International Education Journal*, vol. 6, no. 4, pp. 467-483.

Keskitalo, P., Frangou, S.-M., & Chohan, I. (2020). Educational design research in collaboration with students: Using digital tools to learn about reindeer herding within a vocational Sámi pedagogical context. *Education in the North,* vol. 27, no. 1, pp. 58-77.

Kong, S.C., Chan, T.-W., Huang, R., & Cheah, H.M. (2014). A review of e-Learning policy in school education in Singapore, Hong Kong, Taiwan, and Beijing: Implications to future policy planning. *Journal of Computers in Education,* vol. 1, no. 2, pp. 187-212.

Kong, S.C., Looi, C.K., Chan, T.-W., & Huang, R. (2017). Teacher development in Singapore, Hong Kong, Taiwan and Beijing for e-Learning in school education. *Journal of Computers in Education,* vol. 4, no. 1, pp. 5-25.

König, J., Jäger-Biela, D. J., & Glutsch, N. (2020). Adapting to online teaching during COVID-19 school closure: teacher education and teacher competence effects among early career teachers in Germany. *European Journal of Teacher Education*, vol. 43, no. 4, pp. 608-622.

Lavonen, J., & Salmela-Aro, K. (2022). Experiences of moving quickly to distance teaching and learning at all levels of education in Finland. In *Primary and Secondary Education During Covid-19* (pp. 105-123). Springer, Cham.

McGee, P., Windes, D., & Torres, M. (2017). Experienced online instructors: beliefs and preferred supports regarding online teaching. *Journal of Computing in Higher Education*, vol. 29, no. 2, pp. 331-352.

Miao Fengchun, Huang Ronghuai, Liu Dejian, & Rongxia, Z. (2020). *Ensuring effective distance learning during COVID-19 disruption. Guidance for teachers*. United Nations Educational & Scientific and Cultural Organization. https://teachertaskforce.org/sites/default/files/2021-04/375116eng.pdf

The Organisation for Economic Co-operation and Development (OECD). (2019). *Country note Finland. The results from TALIS 2018.* OECD.

Paris, S. G., & Paris, A. H. (2001). Classroom applications of research on self-regulated learning. *Educational Psychologist*, vol. 36, no. 2, pp. 89-101. doi:10.1207/S15326985EP3602_4.

Park, S., and Yun, H. (2018). The influence of motivational regulation strategies on online students' behavioral, emotional, and cognitive engagement. *American Journal of Disttance Education,* vol. 32 no. 1, pp. 43-56. doi: 10.1080/08923647.2018.1412738

Pöntinen, S. 2013. *Tieto- ja viestintäteknologian opetuskäytön kulttuurin diskursiivinen muotoutuminen luokanopettajaopiskelijoiden puheessa* [Discursive shaping of the culture of ICT use in the speech of classroom students]. Publications of the University of Eastern Finland Dissertations in Education, Humanities, and Theology No 49.

Prestridge, S. 2012. The beliefs behind the teacher that influences their ICT practices. Computers and Education, vol. 58, no. 1, pp. 449-458. DOI: 10.1016/j.compedu.2011.08.028.

Redecker, C. 2017. *European Framework for the Digital Comptence of Educators.* European Commission. JRC Scientific and Policy Reports. DOI: 10.2760/159770.

Sipilä, K. 2013. *No pain, no gain?: educational use of ICT in teaching, studying and learning processes : teachers' and students' views*. Lapin yliopistokustannus. https://lauda.ulapland.fi/handle/10024/61641

Spiteri, M., & Rundgren, S. N. C. (2020). Literature review on the factors affecting primary teachers' use of digital technology. *Technology, Knowledge and Learning*, vol. 25, no. 1, 115-128.

UNESCO. (2021). *COVID-19: Reopening and reimagining universities, survey on higher education through the UNESCO National Commissions*. https://unesdoc.unesco.org/ark:/48223/pf0000378174

Vassallo, S. & Warren, D. (2018). 10. Use of technology in the classroom. In Australian Institute of Family Studies, Longitudinal Study of Australian Children (LSAC) Annual statistical report 2017. https://growingupinaustralia.gov.au/research-findings/annual-statistical-report-2017

Welsh Government. (2018). An introduction to the professional standards for teaching and leadership. Wales: Crown.

Yot-Domínguez, C., & Marcelo, C. (2017). University students' self-regulated learning using digital technologies. *International Journal of Educational Technology in Higher Education*, vol. 14, no. 1, pp. 1-18.

Yun, H., & Park, S. (2020). Building a structural model of motivational regulation and learning engagement for undergraduate and graduate students in higher education. *Studies in Higher Education*, vol. 45, no. 2, pp. 271-285.

Zimmerman, B. J. (1998). *Developing self-fulfilling cycles of academic regulation: An analysis of exemplary instructional models.* In D. H. Schunk & B. J. Zimmerman (Eds.), *Self-regulated learning: From teaching to self-reflective practice* (pp. 1-19). Guilford Publications.