Talent leadership strategies enhance teacher’s professional competencies in 21st century education for sustainable development

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Abstract. At present, integrate sustainability with education has been put one of the school’s mission. Students must master sustainability skills. In order to explore the desirable methods of K-12 teacher’s professional competencies on education for sustainable development and to identify talent leadership strategies could enhance teacher’s professional competencies in 21st century education for sustainable development, this research adopts the content analysis method. The author systematically reviewed and analyzed related research works on education for sustainable development, teacher professional competencies and talent leadership strategies. According to the synthesis the results of content analysis, the desirable methods of K-12 teacher professional competencies for sustainable development are as follows: content focus on sustainability with 21st century skills, collaboration with peers, active learning, apply models of learning sustainability in practice, peer-mentoring, feedback and evaluation, duration, teacher professional development. To achieve the second research objective, the author found that the talent leadership strategies could enhance the professional competencies of K-12 teachers for sustainable development, including K-12 teacher professional development methods, K-12 teacher professional competencies, student performance and focus on student achievements.

1. Introduction
In the 21st century, the new trends of technologies, economies, politics influence people’s social life, workplace and lifestyle, especially the environment and resource challenges. Under this situation, education needs to be changed to catch up with these emerging trends. Traditional K-12 education is not popular, educators appeal we should reform the curriculum and instruction in order to teach students sustainability, such as poverty, citizenship, peace, democracy, security, human rights, social and economic development, health, gender equity, cultural diversity, environmental protection, natural resource management, rural and urban development, production and consumption patterns, and corporate responsibility. Teachers have to master all of them then can teach the student. To achieve this goal, school leaders have to develop teacher professional competencies to meet student needs.
2. Literature review

2.1 Related concepts of education for sustainable development

2.1.1 Sustainable development

Sauve and Montreal (1996) put forward that education should be reformed according to UNESCO document sustainable development as the main task. What is Education for Sustainable Development (ESD)? The report of ESD program was written by McKeown, Hopkins, Rizi and Chrystalbridge (2002) describes that Education for Sustainable Development focuses on sustainability in schools. Linking education with sustainability is the central mission. In their research, four dimensions have been summarized:

1. promote basic education
2. re-orient present education to enhance sustainable development
3. address public knowledge and understanding
4. training.

This study will develop the education though talent leadership strategies enhancing teacher’s professional competencies education for sustainable development in 21st century.

2.1.2 Education and sustainable development

Sustainable development contains three pillars of environment ecology, economy and society (Nikolopoulou, Abraham & Mirbagheri, 2010). Education as the most fundamental element plays a significant role (see Figure 1).

![Figure 1. The position of education as the basis of the three pillars](Source from: Nikolopoulou, Abraham & Mirbagheri (2010) Education for Sustainable Development. California: Sage)

On the other hand, education could have a contribution to the common good, promote national development, and assist constant family, neighbourhood, and community. When facing the challenge in economy, environment, and society, education is even more significant in the 21st century than it in the past. Students have to face future challenges whether they are prepared as citizen, employee, manager, parent and leader in the future (Pellegrino & Hilton, 2012), particularly, contribute to sustainable development. Jerald (2009) argues the new trends of technologies, economies, politics impact people’s community, workplace and lifestyle while sustainable development becomes more and more needful. Face all of challenges, education needs to be reformed to meet world needs. Traditional education is not adaptable, educators appeal we should innovate curriculum and instruction in order to teach student with sustainability.
2.1.3 Content of education for sustainable development

According to Nikolopoulou, Abraham & Mirbagheri (2010) book “Education for Sustainable Development” delves the content of education for sustainable development that involves poverty, citizenship, peace, democracy, security, human rights, social and economic development, health, gender equity, cultural diversity, environmental protection, natural resource management, rural and urban development, production and consumption patterns, and corporate responsibility.

2.1.4 21st Century skills enhancing sustainability

As for education, student achievement and success are education final objectives. Kozma (2008) suggests students could receive high academic performances when they could master the 21st century skills. 21st century skills could enhance students learning sustainability development knowledge.

The framework for 21st century learning (Partnership for 21st Century skills, 2007) concludes: Critical thinking and problem solving—students can think of problems critically and have the competencies to solve problems; Cross-cultural understanding—students learn different culture and have a good understanding with mixed-culture; Creativity and innovation—students own creative and innovative ability in study and work in future; Communications—students can communicate with others well; Information—students know how to search information and select useful and valid ones; Media literacy—students know how to search information and select useful and valid ones; Computing and ICT literacy—students have sufficient media literacy that cloud protect privacy, discriminate truth, prevent be cheated; Computing and ICT literacy—students have abilities to know and use computers, classroom technologies and so on. 21st century skills could be used in education for sustainable development.

2.1.5 Characteristics of sustainable schools

Students need 21st century skills (Wan & Gut, 2011) which could be used in sustainability learning. In order to meet the requirements and needs of 21st century education for sustainable development, nowadays schools have to serve teacher in learning sustainability with 21st century skills (Dewey, 2008) by providing the practices, a human resource supporting and related infrastructure. Sustainable schools also supply professional development activities to stimulate teachers collaborated (Bellanca & Brandt, 2010) to learn sustainability.

3. Methods

This paper used a content analysis method to achieve objectives—To explore the desirable methods of K-12 teacher professional competencies on 21st century education for sustainable development; To identify talent leadership strategies could enhance teacher’s professional competencies in 21st century education for sustainable development.

The author systematically reviews researches published online in recent years focus on education for sustainable development, teacher professional competencies and talent leadership. The identified keywords based on the paper objectives have concerned on effective K-12 teacher professional competencies methods in 21st century education. Under the theme of methods of K-12 teacher professional competencies on education for sustainable development and talent leadership, word frequency counts for each identified keyword were collected and categorized. The data were gathered and summarized responding to the paper objectives. Through analysis education for sustainable development, teacher professional competencies methods and talent leadership, propose the desirable methods of K-12 teacher professional competencies on 21st century education for sustainable development and talent leadership strategies could enhance teacher’s professional competencies in 21st century education for sustainable development.

Obviously, to answer the first research question, the author identifies the desirable effective teacher professional development methods in K-12 education institutions for 21st century education. According to analysis the research publications online, the desirable methods of K-12 teacher professional competencies on 21st century education for sustainable development are following: content focus on sustainability with 21st century skills, collaboration with peers, active learning, apply models of learning sustainability in practice, peer-mentoring, feedback and evaluation, duration, teacher professional development. To answer the second research question, the author finds the talent leadership strategies could enhance teacher’s professional competencies in 21st century education for sustainable development.
development including K-12 teacher professional development methods, K-12 teacher professional competencies, student performance and focus on student achievements.

4. Analysis and discussion

4.1 Professional competencies of K-12 teachers

4.1.1 The trend of teacher’s professional competencies

What are competencies? It can be identified that people have to master knowledge, skills and experiences in daily activities and could use these to do the future work. Another definition is a person’s knowledge, skills, attitudes, values, motivations and beliefs that address he or her to be successful in the careers (UNESCO, 2010). Selvi (2010) mentions the general content of professional competencies includes three parts—the competencies in field, the competencies in pedagogy and the competencies in culture. Teachers’ professional competencies are made of different areas except for the three main dimensions.

Bertschy (2013) found that teacher professional competencies include two kinds of model. The first is “the Curriculum, Sustainable Development, competencies, Teacher Training (CSCT) model”. This model demonstrates teacher professional competencies develop curriculum sustainability, stimulate teacher’s competencies and evolve teacher training practices. The second model states learning is preparation for the future—the competencies in Education for Sustainable Development (ESD)—this model shows developing teacher profession to meet student needs in the future. Although the two kinds of teacher professional competencies model look very different, they are also effective to improve teacher professional competencies.

4.1.2 Professional Competencies of K-12 Teachers Enhancing Students’ Learning

K-12 teacher’s professional competencies can influence student achievement and motivation. In this regard, Kunter (2013) states, it is obvious that teachers with a good understanding of subject content, high quality of beliefs, original motivation and orientation, and control themselves regularly that will promote student achievements and motivation. On the other word, the teacher’s level of knowledge and constructivism beliefs can predict student motivation and achievements. Specifically, the motivation and self-regulation of teachers can predict student performance and motivation.

4.2 Teacher’s competences for the 21st century education

4.2.1 Teachers’ competencies for the 21st century schools

Caena (2013) points the K-12 teacher professional competencies content contains these features: teacher should have tacit and explicit knowledge, practical knowledge and think cognitively. Especially teacher should have higher motivation, positive believes, right values and can handle their emotion. Based on these abilities and skills, the teacher could solve more difficult problems and apply them to subjects to address teaching practice. These emotional skills also impact the teacher profession in different situations, which help teachers undertake tasks and meet the requirements.

Further, as we can see there is a trend on using technology, the information in the 21st century education. School leaders ask teachers to learn the ICT (information, communication, technology) skills is critical (UNESCO, 2011).

4.2.2. 21st Century teachers’ competencies affecting students’ learning outcomes

Teachers adopt creative methods into curriculum and instruction which provides chances for students to improve critical thinking and problem-solving skills. And students can learn content knowledge of life experience that could remember a long time (Ennis, 2013). Teachers choose practical learning methods into the classroom to teach the subject. For example, there are new subjects like in Physics, the new class—“science, sports, and me”. In this creative class, students could check the sports results by their bodies in a physical way.
Kozma (2008) describes that students learn the 21st century skills, knowledge, which are good for a student getting high academic achievements, better live and work in future. A teacher who has high competency in 21st century education will improve student performances and achievements a lot. 21st century skills, such as critical thinking skills and problem-solving skills are good for student achievement (AACTE, 2010).

4.3 Teacher professional development towards the 21st century education

4.3.1 Theories of teacher professional development

There is not enough literature talk about teacher professional development (TPD) definitions, Linda (2008) summarizes, even the experts try to find out the perfect definition but it is failing. Some few works of literature about teacher professional development that name TPD is teacher improving their content knowledge, pedagogy knowledge, critical thinking and problem-solving skills which can be used in teaching students. And these skills and knowledge can be formed in learning and communication with peer teachers. So, the definitions of teacher professional development are the process to enhance teacher characteristics. It is a process that a person can be developed to a professional one. There are two kinds of teacher professional development—functional development and attitudinal development. Attitudinal development is the procedure about teacher’s attitude formed on work while the functional development is the process about teacher’s intelligence and motivation transformed.

Haßler (2014) makes the point that once teachers who apply active learning strategies into classrooms, they would become reflective practitioners. In this class, students study content through problem-solving, critical communication, asking question, and applying logic thinking. Hence, teachers have to learn this method by attending professional development activities. He also suggests name of “teacher education” or “teacher professional development” is better than “teacher training”. Educators assemble the communicate learning environment for teachers, which present high quality discussion with learners and practical activities. Learners open answer question would attract student’s participant in the learning process actively. Learners can gain useful information from other teachers’ thoughts when they ask teachers to speak their critical thoughts. Applying technologies in education are usual that enhance interaction and collaboration. And educational technologies bring the most beneficial effects on students learning. Schools should support teachers in using technology in classroom, which needs an adaptable professional development program.

Another study of Postholm (2012) shows that the teacher professional development is about the learning of teacher—which is the way of teaching how to learn and how they use the knowledge, abilities and skills into teaching student learning. Teachers can get knowledge and skills when they attend coaching or learning activities in school. They also can improve their professional skills through do classroom research and learn from peers in collaboration. Teachers can learn when attend learning and evaluating meetings. Teachers can learn from peers group when they have reflective and planning activities in learning teaching and knowledge.

Linda (2014) puts forward that there are three main research reports about teacher professional development opportunities in learning—from the Stanford center for opportunity policy in education in the United States. First is teachers want to get more professional learning experience focus on disabling student, subject context, classroom leadership, and use technology. Second is about teachers do not have enough chances to attend a sustained time (less than 8 hours) professional development and also less time on workshops. The third report says state improve professional development for teachers including following things: standards for professional development, accountability and monitoring of professional development efforts, various intermediary offices that provide the infrastructure and support for professional development in district; and resources that schools and districts can use to enhance professional development efforts.

Teacher professional development content is identified by Blank (2008), teacher professional development provides teachers with subject content knowledge and related skills. He also describes active learning method has been used in teacher professional development activities that gives teacher better opportunities to improve themselves; in general, teacher professional development requires teachers learn in school and with peers; native curriculum are also used as learning materials in teacher
professional development; adequate time is important for teacher professional development activities. The last but also critical factor is feedback and evaluation. In order to achieve the goal of feedback and evaluation, these measurements are pointed: should care for implementation of development program’s quality; the teacher knowledge has been added; teacher’s classroom practices have been transformed, and student achievement is improved.

In part, duration plays a very critical role in professional development education. If professional learning is short of time, not attentive and disorder, teachers won’t get big help form development activities and the same with students. To boost teachers change practice in classroom, school leaders should supply enough time on teacher professional development (DeMonte, 2013).

All in all, the keywords about effective teacher professional development are focus the content, active learning, develop collaboration, apply models in practice, provides coaching and expert support, and feedback and evaluation about teacher profession and sustained time (Hammond, 2017 & Blank, 2008 & Postholm. 2012 & Gökmеноğlu, 2015, DeMonte, 2013).

4.3.2 Teacher professional development for the 21st century education
Education is changing in the world nowadays (Reimers, 2012 & Reimers, 2012). In the 21st century, societies change a lot and stimulate to transform the education system. Under reforming education, teacher professional development becomes one of important part. Educators point out the most significant to pay attention is the teacher’s work- teaching as a profession. Professional development is a person in one’s professional role. Teacher professional development is a teacher gain as a result of getting experiences and evaluate one’s teaching systematically. Professional development contains formal experience and informal experience. Effective professional development influence teacher’s work both in-school and out-of-school deeply. Professional development also impacts the relationship between teacher’s belief and behavior and teacher’s quality and practice in the classroom which impress student learning and performance. The higher professional development has, the better student achievement will happen.

High-quality teacher professional development refers to the main content of TPD activities, subject matter, pedagogy and curriculum and their delivery to teachers are found by Pedemonte (2016). The author study implies focus on the subject matter, delivered with greater degrees of collective participation, active learning, collaboration and longer duration relate to the classroom practices teaching are effective TPD methods reported by teachers. In his research, teachers adapt collective participation method to ask students do some assignments at least one week, arranging them do the project with divided into small groups for collaborative learning.

4.4 Talent leadership towards teacher professional development

4.4.1 Talent leadership theory
Talent management and leadership are plausibly one of the most substantial topics in 21st century organization. Apparently, researches of talent leadership in an organization is limited. Actually, talent management often pours attention into industrial-organizational (I-O) theory and human resource (HR) profession, which encompasses identify select, develop, and retain the high quality and the suitable staff (Silzer & Dowell,2009). Talent is a very vital element in school success. People who have talent that alter performance in the organization, by their short work or a long process of develop the best potential and values (Davies & Davies, 2011; Ford, 2010). Talent management can definite as an organization finds, leads and develops the members present and towards the future (Davies & Davies, 2011; Cannon & McGee, 2010). Talent leadership theories mentions, in a school planning, leaders should explore strategies of the organization performance to meet the now and future needs and build necessary processes to access measuring school competencies (Cannon & McGee, 2010).
4.4.2 Talent leadership enhancing teacher professional development

The Organization for Economic Co-operation and Development (OECD) defines teacher professional development broadly, which are processes to enhance teacher’s skills, knowledge, practices and other areas. Professional leadership address teachers make a significant career transformation and develop their talents, strength profession (CAMBRIDGE international examinations, 2015). Indeed, talent leadership concern help teachers with identifying their talents and put the talent into practice. American institute research (2014) demonstrates a talent development framework that mentions three key elements: school leaders should meet your student requirements by arranging adequate talent into profession; school leaders should make a preparation to meet your student needs though developing future talent teachers and administration; school leaders can meet your student needs with support and retain teachers those who can continue to keep high quality teaching and use their talent into practicing. Besides, the Department of Education & Training (2005) states school leaders should make connection between high quality teaching and student achievement and promote the skills and knowledge of the education in developing professional teachers. As educational leaders, design and implement effective professional development are their major jobs (Linda, 2014).

4.5 Deming Circle

Deming circle is accustomed to implementing quality management and for sustainable improvement. This organization approach is found by W.E. Deming and also named PDCA (plan-do-check-act) circle (Sokovic, Pavletic & Pipan, 2010). Plan Set vision, the mission for an organization. Do The steps, methods, strategies to achieve the goals. Check Evaluate and access the results. Act Identify room for improving.

5. Results

In the 21st century, K-12 students are expected to learn 21st century skills, school leaders ought to find adequate educational leadership to develop a teacher’s professional competencies. School leaders develop the individual’s talent, skills and ability of 21st century skills to meet the student's present needs and towards the future. In Table 1, K-12 school leaders enable every teacher’s skills, abilities and knowledge of 21st century to make school success. Talent leadership school leaders take advantage of these seven methods to refine teacher professional competencies (see in Figure 3).
Figure 3. Talent leadership strategies enhance teacher’s professional competencies in 21st century education for sustainable development

5.1 For answering the first research question
According to the synthesis the results of content analysis, the desirable methods of K-12 teacher professional competencies for 21st century education are as follows: content focus on 21st century skills, collaboration with peers, active learning, apply models of learning 21st century skills in practice, peer-mentoring, feedback and evaluation, duration. Content focus on sustainability with 21st century skills Concentrate on main content and teaching strategy models on 21st century skills are key on teacher professional development that aid teacher pick up sustainability with 21st century skills and how to teach students. Collaboration with peers. Collaboration with peers and subordinates. Every teacher has his or her talent, learn from peers, lead a demonstration lesson; manage teamwork and discussion, teachers also can talk about student works with other teachers. Applying technologies in interaction and collaboration as well as work. Active learning. Active learning method has been used in teacher professional development activities that give teacher better opportunities to improve themselves. Apply models of learning sustainability in practice Teachers apply the teaching theories, concepts and models of sustainability skills into real classroom. They have to learn how to teach students 21st century skills. Peer-mentoring. In talent leadership strategies, leaders operate peer-mentoring instead of traditional expert coaching. There are some teachers with talent in 21st century skills. Some predominate in critical thinking and problem solving, some shine at creativity and innovation and some do well in computing and ICT literacy and so on. These teachers could be mentors. Feedback and evaluation The feedback and evaluation of TPD are momentous. The purpose of feedback is implementing TPD’s quality and efficiency. In addition, feedback should confirm teacher talent have been developed, teacher’s classroom practices have been transformed, and student achievement is improved. Duration. Adequate time is essential for teacher professional development activities. Teachers should have enough chances to attend a sustained time (such as more than 8 hours) professional development and also enough time on workshops.

5.2 For answering the second research question
Talent leadership strategies include K-12 teacher professional development methods, K-12 teacher professional competencies, student performance and focus on student achievements. The ineffective professional development process, K-12 teachers are required to boost their professional competencies, to master the content of sustainability skills and know how to teach sustainability skills for students. Student master it and display better learning performance. Surely, student academic achievements and
sustainability skills would be heightened. The student achievements reflect whether the model is valuable.

6. Conclusion and implication
K-12 school leaders could though take in these effective methods K-12 teacher professional development for developing sustainability with 21st century skills, which involves a content focus on sustainability with 21st century skills, collaboration with peers, active learning, apply models of learning sustainability in practice, peer-mentoring, feedback and evaluation, duration, teacher professional development. Teachers attend professional development school open subject content course to provide teacher master content knowledge. The talent leadership strategies for K-12 teacher’s professional competencies for ESD, including K-12 teacher professional development methods, K-12 teacher professional competencies, student performance and focus on student achievements.

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