Contextual teaching and learning (CTL) as a strategy to improve students mathematical literacy

N Afni and Hartono
Department of Mathematics Education, Graduate School Program, Universitas Negeri Yogyakarta, Indonesia
E-mail: nurafni.2018@student.uny.ac.id

Abstract. Mathematical literacy is defined as solving and using mathematics in various problems to solve problems in real life. This problem begins with identification and problem solving. Students will easily understand mathematics by applying their knowledge in various situations or contexts. This ability can be trained through Contextual teaching and Learning (CTL). This approach is one of the strategies that can improve students' mathematical literacy. Because CTL can be used to connect real-world situations with mathematics so students can understand and solve problems. CTL is recommended to make students use mathematical knowledge in understanding, solving problems and communicating. However, not many teachers are aware that increasing students' literacy skills can use CTL. Learning mathematics using this context is a means of increasing students' mathematical knowledge. Students will be helped and feel happy when learning mathematics related to the context that exists in everyday life. Therefore, the use of contextual learning strategies is very important for teachers and students in improving mathematical literacy skills.

1. Introduction

The application of mathematical concepts in solving mathematical problems is the focus of mathematics learning in the current era of industrial development. Students are guided to understand problems and use appropriate mathematical concepts to solve problems and find new knowledge. Mathematical learning includes cognitive abilities such as reasoning, representation, communication, connection, and mathematical problem solving [1]. Therefore students and teachers are required to implement a learning strategy related to problem solving abilities and mathematical concepts.

Learning mathematics in class often uses existing problems in daily life or the real world. Through this problem students can learn to identify problems and problem solving strategies. This learning process allows students to interpret problems and solve them using mathematical methods. The results of learning to solve these problems can improve the ability called mathematical literacy.

Facts show that there are those who still think that learning mathematics is only related to calculation problems. Mathematics is better known to the public as the ability to calculate, but in reality the ability to calculate is not enough to overcome more complex problems in real life [2]. So we need an ability to connect the real world and mathematics. Therefore teachers and students must have the right strategy to solve problems that exist in real life by using the mathematics ways.

Someone said to be mathematical literate or have mathematical literacy if he has the ability to formulate problems or understand mathematical concepts, use reasoning in solving problems, be able to
connect mathematical abilities with various contexts, be able to communicate them in mathematical language, and be able to interpret mathematical abilities in daily life from various contexts [3]. Literacy is also an assessment content in PISA. One of the skills surveyed by PISA in mathematics is the ability of mathematical literacy. PISA [4] states that the ability of mathematical literacy is defined as the ability of a person to formulate, apply and interpret mathematics in various contexts, including the ability to do mathematical reasoning and use concepts, procedures, and facts to describe, explain or predict phenomena / events. Contextual problems are used as instruments by PISA to measure students' mathematical literacy. So the need for a strategy or approach based on context.

Many learning strategies use contexts, one of which is the contextual teaching and learning (CTL). This approach is a learning strategy that helps students connect material with real world situations and encourages students to make connections between the knowledge they have and their application in daily life [5]. Contextual Teaching and Learning (CTL) will be more meaningful for students because it involves situations or problems that exist in their environment [6]. But making students understand mathematical concepts in order to be able to apply them to everyday life often experiences obstacles. The fact is that there are still teachers who do not understand the importance of contextual learning. So the question arises whether contextual teaching and learning is a way to improve students' mathematical literacy? To answer this question, the authors systematically review relevant journals to meet whether CTL could possibly improve mathematic literacy.

2. Method
This article uses the literature review method regarding knowledge, ideas, or findings contained in the literature. So that it can provide theoretical and scientific information related to contextual approaches in improving students' mathematical literacy abilities. Data is collected and analyzed in the form of contextual learning literature and mathematical literacy abilities. In this article, the authors describe the reasons for a contextual approach as a learning strategy that can improve mathematical literacy. In addition, the authors also describe the stages in a contextual approach that can improve students' mathematical literacy. So by applying a contextual approach to mathematics learning mathematical literacy students can be improved. Data obtained from scientific journals and some author's experience.

3. Results and Discussion
3.1 Mathematical Literacy
Problems given to mathematics learning are inseparable from problems in real life. Students are identified as having difficulties and do not understand even cannot solve the problem [7]. This causes students to be less skilled in using their ability to use their mathematical knowledge to solve problems of daily life. This ability is often referred as mathematical literacy [8]. If students are able to use mathematical literacy, they can make models and predict solutions to mathematical problems quickly and easily [9].

Mathematical literacy in the context of PISA is as a person's ability to formulate, use and interpret mathematics in a variety of contexts, which involves the use of mathematical reasoning abilities, concepts, procedures, facts, and tools to describe, explain, and make predictions about an event, which helps someone to recognize the usefulness of mathematics in real life, as well as a basis for consideration and decision-making needed by the community [10]. De Lange [11] argued that mathematical literacy is the ability of students to analyze, reason, and communicate their ideas when formulating, completing, and interpreting mathematics in various situations. This opinion is also supported by Ojose [12] who states that mathematical literacy is knowledge in understanding and applying mathematics in daily life. So it can be concluded that mathematical literacy is one's ability to formulate, use, and interpret mathematics in situations or contexts of life.

Mathematical literacy concept closely related to modeling and mathematics. This process is related to translating real life problems into mathematical language [13]. Thus, the problem can be interpreted to provide solutions to real life problems. Mathematical literacy ability includes mathematical ability which is interpreted as modeling a phenomenon mathematically (in the sense of looking for mathematics relevant to a phenomenon) or constructing a mathematical concept of a phenomenon [14]. Literacy is
divided into several dimensions, namely numerical literacy, spatial literacy, and data literacy. Thus, mathematical literacy includes all concepts, procedures, facts and mathematical tools in terms of calculations, numbers and spaces [11].

Literacy means also the ability to read and write. this ability is an important component [13]. these abilities are needed in carrying out daily activities related to formulating real life problems into the language of mathematics. So that the problem can be solved as a mathematical problem, and the mathematical solution can be explained clearly to provide answers to real-life problems. Mathematical literacy is very similar with the understanding and use of mathematics concepts, especially in the problem solving process. So learning is better started by giving initial problems in real contexts [15]. Furthermore, to develop this ability students can also be given non-routine problems in everyday life. It aims to train students to improve their mathematical literacy skills. As stated by Murdiyani [16] through his study that students can solve non-routine problems in daily life according to the PISA level, they only reach level 1 to level 3. So it is necessary to provide non-routine real problems training to students so that mathematics literacy skills students are able to reach 6 levels given by PISA.

Mathematical literacy as an people's ability to formulate, applying and interpret mathematics in many contexts [13]. This along with mathematical reasoning, applying concepts, proceduring, facts as well as tools to describe, explain, and predict phenomena. However, there are still students who find it difficult when formulating mathematical situations and making arguments based on information or mathematical results obtained [17]. so the provision of exercises to solve mathematical problems needs to be accompanied by context-based learning that exists in student life. In addition, the factors of students difficulty in applying mathematics in solving problems must be identified so that students' mathematical literacy abilities can develop more optimally.

Development of mathematical literacy ability is a goal to be achieved in a mathematics learning. Students in the process of learning mathematics, especially in problem solving must be trained to be able to understand and use mathematics itself. For example by presenting problems in real situations and asking students to identify relevant mathematics or organizing or constructing problems based on concepts, identifying a problem, and solving problems back into real life. So this ability needs to be improved because it is very beneficial for students as a provision to continue study, work, and solve problems in their environment. Therefore, teachers must support students in developing the knowledge they have, by giving them the opportunity to solve problems that exist in the context of everyday life.

3.2 Contextual Teaching and Learning (CTL) in Mathematics

Improving students' ability to use mathematical concepts in various situations or mathematical literacy is highly demanded in this century. Because to solve problems in various fields requires a good ability to understand mathematical concepts. Therefore, learning mathematics in schools today must use strategies that can help improve students' ability to apply mathematical knowledge in solving existing life problems. A suitable strategy to improve this ability is the strategy of learning mathematics through context or contextual teaching and learning (CTL).

CTL is a learning process that helps students see the relations of context and meaning of the material they are learning by connecting the material with the context of daily life, personal environment, social, and culture [18]. Contextual comes from the word context which means, relations, context, atmosphere, or situation [19]. Contextual learning can be interpreted as learning related to a particular situation in the learning process in class. The basic concept of contextual learning is that the teacher presents the real world in mathematics learning in the classroom and focusing students finding real-world connections with mathematics learning [20]. But students also need to be guided in the process of connecting mathematical concepts with real-life contexts. So the teacher's role as a facilitator is needed when learning takes place.

Contextual learning is a learning approach that can help teachers relate the material being taught to real life and encourage students to make connections between priority knowledge and application in their daily lifes [6]. Contextual learning raises three main understandings, namely: emphasizing the process of student involvement to find mathematical material, meaning that the learning process is oriented to the
process of direct experience. So, the contextual learning process does not expect that students only receive lessons, but the process of research and inquiring their subject.

Contextual learning has seven components, namely: (1) Constructivism, is a philosophical foundation in contextual learning which means that knowledge is built up and the results are expanded through limited contexts; (2) Inquiry, the essence of contextual learning that knowledge obtained is not the result of remembering a set of facts, but the results of finding themselves; (3) Questioning, asking is the beginning of knowledge gained. Asking questions is an activity that is expected to be carried out by students; (4) Learning community, so that learning outcomes are obtained from collaboration with others; (5) Modeling, requires a certain learning model that can be imitated by students. In CTL the teacher is not the only model, but the model can be designed by involving students. In step (6) Reflection, at the end of learning given the opportunity to rethink what has been learned; (7) Authentic assessment, the process carried out by the teacher to collect data about student learning development [21].

Crawford [22] states that the strategies used in contextual learning include looking for relating, experiencing, applying, cooperating, and transferring. Through this strategy the teacher can stimulate students to find their new knowledge by linking the knowledge they already have with real situations [23]. So students more actively involved and can have meaningful learning through tangible objects in their environment [24]. Besides that students can also learn more productively and can understand concepts easily.

Contextual learning encourages students to discover the relations of mathematics learned with real life situations [20]. This means that contextual learning not only expects students to understand the material learned, but how the subject matter can interpret its behavior in everyday life. Fajriyah also [6] revealed that learning mathematics using a contextual approach succeeded in influencing students' mathematical reasoning abilities. This means that through CTL can activate students' mathematical reasoning abilities. This ability is needed in the process of solving problems. So that through contextual learning, students will solve problems by being actively involved and able to experience meaningful experiences through tangible objects that they get from their own environment [25].

The process of learning mathematics will be more fun and meaningful if learning by connecting the context and experience of students [21], because learning is not just listening and taking notes, but learning is a real experience process. CTL can make learning more meaningful and real because students learn to combine learning in class with real world problems [22]. Through this process, it is hoped that the development of students' thinking abilities will develop well, which not only develop in cognitive aspects, but also affective and psychomotor aspects. Learning through context, students can find their own core of topics learned. The contextual approach emphasizes the context of learning in real-world situations of students and of the basic knowledge that they have acquired, therefore it is necessary to direct students in the environment of real life [15].

Students perform the stages of solving mathematics related to context by arousing the knowledge they have about the context of the problem and then connecting it with formal mathematical knowledge that they have learned previously [26]. This requires the teacher to plan learning well and professionally so that active, innovative, creative and fun learning can be created.

Ariyadi [27] argues that students learning to solve problems through contextual problems (contextual problems based on geogebra) can lead students to explore problem contexts using non-mathematical strategies. This is an early stage exploration in mathematical creativity. Contextual learning can directly help students develop their mathematical creativity abilities. So learning mathematics with a contextual approach is very important to stimulate students to explore the knowledge they have.

CTL has features that can be integrated into a variety of learning strategies [28]. Such studies conducted by Oktaviani & Retnowati [29] integrate faded-examples in contextual mathematics learning to improve students' problem solving abilities. So that CTL can be combined with other strategies to improve students' ability to solve problems. Through the combination of CTL with various strategies, this makes learning more varied and meaningful for students and teachers.

Marzuki [15] revealed that the classes using CTL in mathematics learning literacy abilities gave better mathematical literacy results than classes that were taught using conventional approaches. Based on these
findings obtained information that through learning with contextual teaching and learning mathematical literacy ability of students increases. Increasing the ability of mathematical literacy through CTL that occur gives the impact that through contextual learning the mathematical ability of students which includes connections, communication, solving mathematical problems of students also increases. So with CTL based learning to teach students mathematical literacy can be an alternative for teachers in developing mathematical literacy. The study conducted by Soleh [30] also revealed that there was a significant influence by applying CTL learning strategies to the ability of mathematical literacy in the Flat Build material of grade VII junior high school students. This shows that learning by using a CTL can help students to develop their literacy skills. Furthermore Wicaksono [5] revealed that CTL with STAD type Cooperative setting was effective in terms of students' mathematical literacy abilities. Therefore contextual learning can be recommended to support practicing students' mathematical literacy abilities.

Based on these findings the authors see that the application of contextual teaching and learning in mathematics learning can make students actively build their knowledge by carrying out activities in accordance with the steps of the contextual approach. Students can solve everyday problems by connecting the existing context to the problem with the mathematical concepts that have been learned. It also ultimately makes students' ability to use mathematics to solve problems better. CTL can be a strategy to improve students' ability to use mathematical concepts in solving problems in varied real contexts. So that through CTL students' mathematical literacy skills can be improved.

3.3 Strategy Contextual Teaching and Learning to Improve Mathematical Literacy

Anderson [31] mentioned that mathematical literacy has context relevance in real life. Mathematical literacy can also make mathematics appear to have a function in various life contexts. This means that mathematics literacy is very much related to context-based learning. So as to improve mathematics literacy a contextual teaching and learning can be used as a strategy to improve mathematics literacy. The meaning of the context used in the CTL must be relevant and can be recognized by students. The real life situation can be used scientifically as a context in learning mathematics in the classroom [32]. Contextualization efforts can reduce the level of abstraction of the object presented [33]. Contextual can help students realize the relationship between argumentation and motivation to apply their knowledge and skills in meaningful ways [34]. So that CTL can be used as a strategy to improve students' mathematical literacy. Hosman [19] states that the contextual approach has five stages namely relating, experiencing, applying, cooperating, and transferring. Learning mathematics by using this approach can carry out learning activities in accordance with these steps. At the relating stage students conduct learning activities looking for contextual relations that exist in problems with mathematical content. The experience phase of the students doing the activities recalling the experiences or knowledge they have that are related to the problem given. The next stage is applying students trying to use mathematical knowledge they already have to solve and find solutions to problems. Next students collaborate between students exchanging opinions about the problem-solving process in a mathematical way. Finally, students do the transfer by presenting how they work to find solutions and apply mathematical ways to solve problems.

Based on studies of learning mathematics with a contextual approach to improve mathematical literacy, it takes several stages. As an example in the application of contextual approaches to mathematics learning, the writer takes the example of a square circumference problem in daily life. This learning is used to improve mathematical literacy students skills by learning with contextual. The mathematics learning activities that are in accordance with the contextual approach that can improve mathematical literacy are: (1) the teacher gives a worksheet that contains problems regarding the circumference of a square. (2) students observe the contextual problems that exist on a worksheet about the circumference of a square, at this stage students will construct their knowledge. (3) gives students the opportunity to look for information to sort out important information from the problem. (4) students can give questions related to the information found, this stage includes the relating component in the contextual approach. (5) students are given the opportunity to discuss with their friends to share information, exchange opinions, and make mathematical modeling. This stage is included in experiencing and cooperating. (6) students are guided to apply existing concepts to find mathematical solutions to problems. (7) students are
asked to present the results of their discussions to the teacher and their peers. (8) the teacher gives input or comments from the results of the presentation. (9) students are asked to conclude their findings. Steps 6 to 8 are applying and cooperating steps.

Starting from observing and sorting out information from the problem at that time students have sought to match their mathematical knowledge with the given problem. At this stage a formulate process occurs in mathematical literacy. Then in the discussion stage to make models and determine mathematical solutions, at that time students do the employed process in mathematical literacy. When students apply mathematical solutions to problems and deduce solutions from problems students have to do the interpretate process in mathematical literacy. By applying the appropriate and appropriate contextual approach steps can improve mathematical literacy skills.

The stages of CTL that are most successful in increasing students' mathematical literacy are trying, applying, and communicating. When students are able to discuss context with the material, students can also arrange solutions to problems related to context. Furthermore, if they are able to apply the context in learning, it means that they arrive at mathematics literacy. If students are able to communicate, students are also able to interpret their mathematical knowledge in solving problems in various contexts. Therefore, the author agrees that if students have successfully completed this CTL then students' mathematical literacy will increase. In accordance with the need to improve mathematical literacy skills.

4. Conclusions
Problems given to mathematics learning are inseparable from problems in real life. There are many students who find it difficult and do not understand even the difficulty of applying their mathematical knowledge to solve problems that exist in everyday life. So it is very important to improve and develop the ability to use their mathematical knowledge in solving everyday problems (mathematical literacy). If students are accustomed to literacy in mathematics then they can model and make solutions to mathematical problems precisely and easily. Several articles in this study show that to be able to improve mathematical literacy a strategy is needed that is in line with the objectives of mathematical literacy. One of them is contextual teaching and learning (CTL), because CTL is a learning strategy that helps students link material learned with real-world situations and encourages students to make connections between the knowledge they have and their application in daily life. This relates to mathematical literacy where students use mathematics concept to solve the problems that exist in everyday activities. Mathematical literacy enhanced by applying CTL into mathematics learning through several stages. There are five stages, namely relating, experiencing, applying, cooperating, and transferring which certainly fit the context in student life. These five stages are interrelated to develop and improve students' mathematical literacy. But the most striking stages to improve students' mathematical literacy are trying, applying, and communicating. Furthermore, for the purposes of the next study it is necessary to further identify the stages in CTL that can improve mathematical literacy.

References
[1] The National Council of Teachers of Mathematics, Principles and Standarts for School Mathematics. United State: Reston, 2000.
[2] U. F. Utami, “Peran Model Pembelajaran Contextual Teacher Learning ( Ctl ) Dengan Direct Corrective Feedback untuk Meningkatan Kemampuan Literasi Dan Self Efficacy Siswa,” Semin. Nsional Pendidik. Mat. Ahmad Dahlan 2018, no. ISSN:2407-7496, pp. 417–424, 2018.
[3] J. Colwell and M. C. Enderson, “‘When I hear literacy’: Using pre-service teachers’ perceptions of mathematical literacy to inform program changes in teacher education,” Teach. Teach. Educ., vol. 53, pp. 63–74, Jan. 2016.
[4] K. Stacey, “The PISA View of Mathematical Literacy in Indonesia,” J. Math. Educ., vol. 2, no. 2, pp. 95–126, 2016.
[5] Y. Wicaksana, Wardono, and S. Ridlo, “Analisis Kemampuan Literasi Matematika dan Karakter Rasa Ingin Tahu Siswa pada Pembelajaran Berbasis Proyek Berbantuan Schoology,” Unnes J.
[6] L. Fajriyah and S. L. Zanthy, “Penerapan Pendekatan Kontekstual Terhadap Kemampuan Pemahaman Dan Komunikasi Matematis Siswa Smp,” *J. Educ.*, vol. 1, no. 3, pp. 211–216, 2018.

[7] A. S. Asmara, S. B. Waluya, and Rochmad, “Analisis Kemampuan Literasi Matematika Siswa Kelas X Berdasarkan Kemampuan Matematika,” *Scholaria*, 2017.

[8] R. H. N. Sari, “Literasi Matematika: Apa, Mengapa dan Bagaimana?,” *Seminar Nasional Matematika Dan Pendidikan Matematika*. 2015.

[9] J. Gainsburg, “Book Review: Hoyles, C., Noss, R., Kent, P., & Bakker. A. (2010). Improving mathematics at work: The need for techno-mathematical literacies,” *Educ. Stud. Math.*, 2011.

[10] OECD, *Assessing Scientific, Reading and Mathematical Literacy*. 2010.

[11] J. De Lange, “Mathematical literacy for living from OECD-PISA perspective,” *Tsukuba J. Educ. Study Math.*, 2006.

[12] B. Ojose, “Mathematics literacy: are we able to put the mathematics we learn into everyday use?,” *J. Math. Educ.*, 2011.

[13] Y. Abidin, *Pembelajaran Literasi: strategi meningkatkan kemampuan literasi matematika, sains, membaca, dan menulis*. Jakarta: Bumi Aksara, 2017.

[14] A. Wijaya, *Pendidikan Matematika Realistik: Suatu Alternatif Pendekatan*. Yogyakarta: Graha Ilmu, 2012.

[15] M. Ahmad and D. P. Nasution, “Peningkatan kemampuan literasi matematika siswa sekolah menengah pertama melalui pendekatan kontekstual,” *J. Educ. Dev.*, vol. 7, no. 2, pp. 103–112, 2019.

[16] N. M. Murdiyani, “Developing non-routine problems for assessing students’ mathematical literacy,” *J. Phys. Conf. Ser.*, vol. 983, no. 1, 2018.

[17] N. D. L. Kurniawati and A. Mahmudi, “Analysis of mathematical literacy skills and mathematics self-efficacy of junior high school students Analysis of mathematical literacy skills and mathematics self-efficacy of junior high school students,” *J. Phys. Conf. Ser.*, vol. 1320 (2019), pp. 0–6, 2019.

[18] E. B. Johnson, *Contextual teaching and learning (Terjemahan Ibnu Setiawan)*. Thousand Oaks: Corwin Press, 2012.

[19] Hosnan, *Pendekatan Saintifik dan Kontekstual dalam Pembelajaran Abad 21*. Bogor: Ghalia, 2014.

[20] Depdiknas, *Pendekatan Kontekstual*. Jakarta: Depdiknas, 2002.

[21] R. Yunianto, “Keefektifan CTL Menggunakan Model STAD dan GI Ditinjau dari Prestasi, Komunikasi, dan Sikap terhadap Matematika,” *Pythagoras J. Pendidik. Mat.*, vol. 9, no. 1, pp. 31–44, 2014.

[22] M. L. Crawford, “Teaching Contextually in Mathematics and Science.” *Science (80-. ).*, 2001.

[23] E. Prasetyawan, “Keefektifan pendekatan CTL dan discovery ditinjau dari prestasi, kemampuan berpikir kritis dan kecemasan matematika Effectiveness of CTL and discovery approach viewed from students ’ achievement, critical thinking ability, and math anxiety,” vol. 13, no. 2, pp. 168–180, 2018.

[24] D. K. Tari and D. Rosana, “Contextual Teaching and Learning to Develop Critical Thinking and Practical Skills,” *J. Phys. Conf. Ser.*, vol. 1233, no. 1, pp. 0–7, 2019.

[25] J. A. Cockrell, K., Caplow, J. Donaldson, “context for learning: ‘Collaborative groups in the problem-based learning environment’..” *Rev. High. Educ.*, vol. 23(3), pp. 347–363, 2000.

[26] M. Anggo, “Pemecahan Masalah Matematika Kontekstual untuk Meningkatkan Kemampuan Metakognisi Siswa,” *Edumatika*, 2011.

[27] A. Wijaya, M. van den Heuvel-Panhuizen, M. Doorman, and A. Robitzsch, “Difficulties in solving context-based PISA mathematics tasks: An analysis of students’ errors,” *Math. Enthus.*, vol. 11, no. 3, pp. 555–584, 2014.

[28] N. Y. Rustaman, “Teaching Science to develop scientific abilities in Science Education,” *Proceeding 2nd Int. Semin. Sci. Educ.*, pp. 94–99, 2008.

[29] K. N. Oktavian and E. Retnowati, “Faded-Examples for Learning Contextual Mathematics
Problem-Solving Skills,” *J. Phys. Conf. Ser.*, vol. 1097, no. 1, 2018.

[30] M. Soleh, W. Syafieni, and H. Sabil, “Pengaruh Strategi Contextual Teaching and Learning (CTL) Terhadap Kemampuan Literasi Matematika Siswa Kelas VII pada Materi Bangun Datar Di SMP Negeri Batanghari,” pp. 1–9, 2017.

[31] J. O. Anderson, M. H. Chiu, and L. D. Yore, “First cycle of pisa (2000-2006)-international perspectives on successes and challenges: Research and policy directions,” *Int. J. Sci. Math. Educ.*, vol. 8, no. 3, pp. 373–388, 2010.

[32] R. Taconis, P. D. Brok, and A. Pilo, *Teachers creating context*. AW Rotterdam, the netherlands: Sense Publisher, 2016.

[33] C. Wijeratne and R. Zazkis, “On Painter’s Paradox: Contextual and Mathematical Approaches to Infinity,” *Int. J. Res. Undergrad. Math. Educ.*, vol. 1, no. 2, pp. 163–186, 2015.

[34] E. D. Baker, L. Hope, and K. Karandjeff, *Contextualized teaching and learning: A faculty primer*. Sacramento, CA: Sacramento, CA: The research and planing group for california community collages, center for student success, 2009.