**Reviewer 1 – Revisions**

This is an informative article on pre-service teachers' noticing. I appreciated the authors' careful analysis of pre-service teachers' abilities to attend to, interpret, and especially respond to students' mathematical thinking prior to preparation in pedagogy and experiences in the field. Understanding pre-service teachers' beginning noticing is extremely important to be able to design effective learning experiences for them.  By focusing on six cases only, the authors were able to illustrate pre-service teachers' understandings and processes in detail and shed light on the importance of prior knowledge and beliefs. This is noteworthy because most of the research on noticing stays at a more superficial level.  Overall, I think the article follows a clear structure and the authors build well their argument. My suggestions below relate to the content of the introduction and to the overall quality of writing.  I would suggest the authors review carefully the text to tighten the language, correct typos and grammatical errors, and avoid repetitions.   In the section on what to learn from previous studies, on page 2, the authors state that through video, teachers can observe artificial classroom settings. I would argue that most work that includes video as a tool for teacher learning uses it as a way to represent the reality of classrooms and therefore presents teachers with footage of real classrooms, not artificial ones.  At the end of page 2, the authors discuss Jacobs and colleagues' work, but then cite right after McDuffie and Turner ... This is an unusual way of referencing other work.  On the top of page 3, I am not sure the section on improving pre-service teachers' noticing is relevant here. I would focus the literature review only on what we know about pre-service teachers' noticing abilities (and responding in particular) since this is the focus on the research summarized by the authors. This would also contribute to shorten the literature review section and make it more to the point. The following structure may be an option: general section on teacher noticing, review of research on pre-service teachers' noticing, more detailed review of research on pre-service teachers' abilities to respond to students' mathematical thinking.  On page 5, in the Participants section, I am not sure what the authors mean by "normal" university.  The Discussion and Conclusions sections need to be reviewed carefully to improve language and clarity. Connections to prior research reviewed in the introduction should be more explicit to make clear the contribution of the authors to the existing literature.

**Reviewer 2 \_Reject**

I enjoyed reading this paper and feel that it addresses an important topic. I found the introduction and literature review to be well-written and thorough, and (despite my comments below) believe that there may be interesting results that could emerge from this study. However, I had major concerns with aspects of the paper and feel that it is not yet ready for publication.   I have two major critiques (that may be fatal but at a minimum would require substantial revision) and one more minor but important concern.   1. Motivation for paper:  A major concern relates to the motivation for the paper - how the paper describes its unique contribution to the literature. The motivation for the paper is framed as coming from two sources. First, the authors note several times in the first few pages that more research is generally needed in this area - either because of a lack of research about PSTs' noticing at the beginning of their programs or because research focuses on commonalities and not differences. I found this first category of motivation to be not especially compelling. It may be the case that there are small holes in the research literature (although I am not completely convinced by the authors explanation), but the authors do not make a strong case for why it might be important to fill these holes. So with regard to this attempt to motivate the paper, the authors fall short, in my read.   The second source of motivation relates to cross-cultural differences and that there are not many studies outside of the US that explore this issue. Although the authors do not devote a lot of time to this motivational explanation (one paragraph, and discussion of the Miller and Zhou (2007) paper), I feel that this area is the most promising avenue for motivating this study. My recommendation would be that the authors devote considerable more attention to better developing this cross-cultural motivational explanation. In addition to discussing more studies that attempt to explore non-US PSTs (e.g., the Santagata et al 2007 paper, with Italian teachers, could be discussed in the service of the culture argument), the authors could try to make a compelling case for why teachers in the US might have different noticing skills than non-US PSTs. There are a number of potentially plausible reasons for such differences, including differences in US and non-US PSTs' content knowledge (US PSTs tend to be weaker in math, for example), differences in teacher education programs (especially in regard to mathematics content courses - even for PSTs at the secondary level - but also in terms of length of practica and other courses), and even differing cultural conceptions about the nature of teaching and the role of the teacher. At present, the paper is not well-motivated, but with more attention to this second source, I see potential for a much stronger paper in terms of motivation.    2. Coding system  A second major concern is the coding system used here. In general, I had great trouble with the justification for and application of the coding categories. My difficulties with the coding system raise issues with the results of the paper more generally.  For the "responding" codes, the authors note that central to this framework are the FOUR types of disciplinary understanding put forth by Kinach, but I was unable to map these four types to the FIVE response categories in the coding scheme. And for "interpreting", I was unclear on how one determined from a response that the interpretation was from a mathematical, pedagogical, or student perspective (some information about this would provided in the results section, but more detail would have been helpful in the methods section). The coding system was generally unclear, as was the analytical procedure by which responses were coded (e.g., who did the coding? was the coding process reliable?).   Furthermore, in reading the results section, I did not find it easy to understand the authors' determination about codes (which again may reflect my confusion about the meaning of the codes and the analytical procedure for coding). For example, why was JING's response in Task A characterized as memorizing and application? This example did not seem to be a clear case for memorization. Similarly, looking at the work in Figure 3 and the subsequent explanation, I am still unclear on why (c) is an example of "Flexible use" while (a), (b), and (d) are "application." I had this reaction upon reading just about all of the case examples - the application of the coding system seemed somewhat arbitrary and unreliable.   3. Selection of cases  Finally, and as a more minor concern, I would have appreciated a bit more information about the selection of the six PSTs. The paper notes that these 6 were selected based on their class, gender, and performance on the PCK assessment. Were these 6 selected in order to have diversity in PCK scores (e.g., some high, some low)? This is not stated - and even if this is the rationale, I also notice that there are 3 high rank, 2 intermediate rank, and 1 low rank student - not an even distribution. So how and why were these 6 chosen? (Also, a minor question - I do not understand what "class" means and how it is a numeric scale. What does 82 on a class scale mean?)

**Reviewer 3 – Revisions**

This paper investigates six Chinese mathematics preservice teachers (PSTs)' noticing of lower secondary students' mathematical thinking. At the time of the study, the prospective teachers had not received teacher education yet. The research is developed around if the prospective teachers' attended to and interpreted students' understandings of distance formula based on the observation of a video clip. The video showed a female teacher's presentation on deducing distance formula and it was followed by two episodes showing two students' strategies in applying the distance formula (i.e. "exchanging order of coordinates"). In order to go deeper into exploring the variations in the preservice teachers' noticing, the author(s) analyzed the preservice teachers' interviews on how they would respond in three related tasks (e.g., "If you were a teacher, how would you respond to this student?"). The analysis lead the authors to discuss the prospective teachers' noticing ability and the factors that seemed to have influenced it.   The topic of the manuscript is interesting and relevant to the JMTE audience. However, it is needed to be revised as regards particular aspects. Below, I do recommend some modifications due to some weaknesses in the paper and some opportunities for improvement.   1. A first point that needs clarification is the description of the focus of the study, how it is related to prior research and how it is addressed by the analysis and the discussion. I explain below.  The main aim of the study is described briefly in the end of the second and the third section. After a review of the literature on preservice teachers' noticing ability in the second section of the paper, the author(s) state that the paper "will extend prior studies on professional noticing to discuss how Chinese PSTs developed their noticing skills prior their teacher education, and to understand which aspects of classroom behavior are most easily noticed and which the PSTs find difficult" (p. 4). The third section explains how "professional noticing" is conceived in the present study and how its components (i.e. attending to particular aspects of a given instructional situation, interpreting students' mathematical understanding and respond to what is noticed) are taken into account in the research focus. I quote: "This study examines six Chinese PSTs' performance in attending to, interpreting and responding to individual students' strategy regarding "order exchange"; to understand better their capacity for professionally noticing students' mathematical thinking prior to their teacher education, the PSTs' responses to three different tasks are examined and contrasted" (p. 4-5).  The above references cannot support a research focus on a consistent way. For instance, it is not explained early in the paper WHY it is an important issue (or how it emerges as an important issue) the need to explore preservice teachers' noticing before starting their own teacher education. This needs to be clearly stated early in the paper. Additionally, the author(s) should integrate this issue in the review of the literature so as to help the reader(s) understand the status of the present study in relation to the existing research in the field. Also, the "three different tasks" in which the pre-service teachers were engaged to respond should be described with more information (e.g., what is the nature of these tasks, why they were chosen) so as to give to the readers a flavor of the research early in the paper. Finally, it is not clear how the first sentence in the description of the research aim ("This study examines six Chinese PSTs' performance in attending to, interpreting and responding to individual students' strategy regarding "order exchange") is related to the second one ("to understand better their capacity for professionally noticing students' mathematical thinking prior to their teacher education, the PSTs' responses to three different tasks are examined and contrasted").   The above problems in the description of the research focus are also evident in subsequent parts of the paper. For instance: In the section Method, we are informed that the present study "is part of a larger investigation of pedagogical content knowledge (PCK) among lower secondary pre-service mathematics teachers from a normal university in a city in eastern China. A large amount of data was collected to reveal these PSTs' knowledge of and beliefs regarding teaching pedagogies and students' mathematical thinking, as well as their mathematics knowledge and mathematical understanding of specific topics. Because the two studies are methodologically similar, this study makes use of PCK data collected through video-based interviews in the larger study" (p. 5). In my view, the research aims of the 'general' study should be described clearly. The references to 'PCK' and 'beliefs' are 'new' for the reader in this part of the paper. Since these terms are also central in the subsequent analysis, the author(s) should make appropriate references to these (e.g., the exact meaning of these terms and how they are used in the present study) earlier in the paper. The present description raises questions such as: how the investigation of PCK in the general study is related to the preservice teachers' noticing in the present study? (Now we are only informed that the present study "makes use of PCK data", p. 5).   2. My second concern is the review of the literature. Some points:  a). The introduction section does not introduce the reader to the main idea of the study. It just mentions the importance of noticing at the level of pre-service teachers. It is just the beginning of the review of the literature that follows.   b). They are not clear the filters/criteria under which the review of the literature is presented. As for noticing, sometimes the focus is on the mathematical content while other times on the mathematics teachers' skills for noticing. Also, it is not clear the role of particular theoretical constructs (e.g. "multiple mathematical knowledge bases" - MMKB, specialized content knowledge - SCK, key developmental understanding - KDU) or frameworks ("skills for listening to students' ideas") in the present study (e.g., If/how they were taken into account in the design of the present study).   c). The meaning of Mason's (2002) quotation is not clear ("one mark of an expert is that their sensitive to notice certain things is integrated into their professional functioning so that all they are aware of it is a possibility to act, but not necessarily of the distinctions which trigger the act", Mason, 2002, p.33; cited in Hand, 2012, p. 236) (p. 4). Also the author(s) should support why (from their own point of view) "the last of the three components - responding to what one notices - is the most complex" (p. 4).   d). The explanation of the term 'professional noticing' as well as its components in the present study are provided at the beginning of the third section although this term is used in the preceding sections of the paper.  e). Preservice teachers' knowledge (e.g., PCK) and beliefs, which appear in the section Method, need to be supported theoretically in the theoretical framework of the paper (e.g., appropriate references, how they are conceived in the reported study).   3. My third concern is the method of the study.   a). In Table 1 is not clear where the ranking refers to. In footnote 2 (p. 5), we read that "the PCK questionnaire consisted of content items from three aspects: knowledge of students (KOS), knowledge of teaching (KOT) and content knowledge (CK)". So, the "Level of accuracy in PCK items" in Table 1 refers to this questionnaire? The "Level of accuracy in CK items" in the same table refers to the CK questions included in the PCK questionnaire?   b). The reference to five categories of analysis should be corrected (p. 7). The categories of analysis are three: Attending, Interpreting and Responding. Responding has 3 sub-categories (Responding to task A, Responding to task B, Responding to task C).   c). The coding scheme for interpreting is not clear. Although it is mentioned that "For the category of Interpreting, the approaches PSTs adopted to interpret the "order" issue were classified as reflecting one of three perspectives - mathematics, students or pedagogy" (p. 7), the coding scheme for Interpreting that appears in Table 2 is the same as the one used for Responding (five types: Memorizing, Application, Process, Flexible use, Mathematical ideas, see Table 2, p. 8). The author(s) need to make the necessary corrections.   d). The reference "Perkins and Simmon" (p. 7) is missed.   4. My fourth concern is the analysis/discussion.   a) It is not explained how 'prior learning resources' and 'beliefs' emerged as explanatory terms for analyzing the prospective teachers' noticing in the present study.  b) "PEI is the only student teacher who adopted a "process" strategy" (p. 14). The respective code in Table 3 should be corrected.   c) The analysis of Yuan's work should be more clear. I explain below.   - The extracts from his interview should be clearly connected with the author(s)' comments about his approaches to tasks A, B and C and the shifts in these approaches.   - In the discussion section we read that "In responding to the student's mathematical thinking regarding order exchange, YUAN's mathematical understanding of this issue exceeded the content of the current curriculum. YUAN preferred to teach from a perspective of coordinate geometry, and tried to help students to understand the meaning of the coordinates of a point; however, for eighth grade students, using Pythagoras' Theorem to deduce the distance formula is a simpler method" (p. 19). In my view, this point should have been mentioned earlier in the analysis so as to help the readers understand Yuan's approach and the respective inconsistencies.   - "Insufficient pedagogical knowledge or representations might limit YUAN's ability to sustain his core belief" (p. 17). This phrase is rather vague. The author(s) should explain/comment how they reach this explanation (e.g., how PCK comes to the analysis of Yuan's work) and to which 'representations' they refer.   - "The PSTs in this study had difficulty providing appropriate instructional explanations, which the researchers attributed to the complexity of unpacking their thinking through explanatory tools, and such additional factors as: (a) subject-matter knowledge; (b) active and deliberate reflection on practice; (c) productive images for engaging in this work; and (d) productive dispositions about engaging in this practice" (p. 18-19). There is not a clear connection between the issues raised here and the preceding analysis. Additionally, the meaning of particular phrases is rather vague (e.g. 'productive images', 'productive dispositions').   5. Language is an issue. The manuscript needs a thorough proof reading by a native speaker. Main problems:   a). Understanding the meaning of particular phrases/terms. E.g. "Crespo (2000) constructed a theoretical framework to assess mathematics teachers' skills for listening to students' ideas, a concept related to yet different from 'professional noticing'" (p. 3); "The exercises they design might not many or very diverse" (p. 9); "Despite the PSTs having a fixed understanding of what they attended to, their responses to different tasks tended to be located in different contexts"; The translation of the first two exercises (Fig. 5) is not correct.   b) Long sentences. E.g. "In the case of YUAN, insufficient teaching methods limited his ability to address two situations (location and segment) as he wished, as suggested by Charalambous et al. (2011), who documented the changes in instructional explanations among four PSTs enrolled in a one-year K-8 teacher certification education program at a large midwestern US university; they found the PSTs had difficulty using appropriate representations as explanatory tools for unpacking their thinking to students" (p. 18).  6. The format of the references should be uniform (e.g. some references to journal articles appear with the first letter in all of their words capital while others not).

**Second round**

**Reviewer 5 – minor revisions**

Overall, the paper is well written, the research question, method, and findings are well aligned and the contents add to the literature on teacher noticing.   Abstract: The abstract is clear and well written.  Introduction: In the opening paragraph, situated learning perspective is referenced, but not cited. It may be beneficial for readers to include a citation for this. The difference between noticing and professional noticing is very clearly described.   Literature: The literature section is very well written with a highly logical flow of discussing noticing with preservice teachers and then extending this idea to noticing within different cultures. As the literature section progresses, there is a natural flow from one topic to the next and it is apparent that the authors are narrowing the focus the literature discussion to align with the purpose of the study. The authors clearly describe their working definition of noticing, based on Jacobs et al. (2010), which is helpful for situating the study within the research base on professional noticing. The authors then include a brief mention of rationale for their decision to base their work on Jacobs et al. (2010) work as opposed to other literature defining noticing, such as van Es and Sherin (2008). This is extremely helpful for framing the study. Page 5, top paragraph has a typographical error/incomplete sentence before "According to Jacobs". The inclusion of PCK in this section is well connected to the literature.   Methods: In the first paragraph, use the word "two" is a little unclear. What are the two studies mentioned? Perhaps the larger study and this smaller study. If so, it would help to clarify this.   In the following sentence, I question the use of the term opportunities, "A key assumption in this study is that PCK can enhance the PSTs' opportunities to notice students' mathematical ideas." Wouldn't all PSTs have the same opportunities, but how they perceive these situations would differ? I tend to think I understand the idea of the authors, but this word choice may need to be reconsidered.   In the Participants section, the following sentence is included: "Based on these responses, five participants were rated as High, five as Intermediate, and five as Low" What does the High, Intermediate, and Low reference? Additional details here would be helpful. Table 1 clarifies this with the column and footnote (level of accuracy in all PCK items), but it may be helpful to include this in the text above as well. Did the High, Intermediate, and Low as originally mentioned in the text refer to the level of accuracy in PCK items or CK items only.   Throughout the method section, the authors provide rationale for their decisions, which is helpful for understanding the decision making process. For example, the authors describe how they arrived at their coding scheme by citing relevant research that was the basis for the framework. Table 2 is helpful for understanding the coding schemes that were used. Additional details about who coded the data and instances of disagreement would be helpful. It would be helpful if the authors could include information about inter rater reliability.   Results: Table 3 is a little difficult to read. Would it be possible to restructure the last three columns to remove the & in the middle? I understand what it is saying, but it is a bit cumbersome. The idea of this table is very helpful to readers and makes the findings quite clear. The findings are written clearly with appropriate examples to support the claims in the data. The figures included in the results all seem purposeful and are helpful to the reader. The focused examples of Zhi and Jing were helpful. Specifically, the inclusion of interview data helped in supporting the claims made. The case of Yuan is presented clearly and is interesting.   Discussion: The first paragraph in the discussion section nicely recaps the study. Then, the author's appropriately situation the findings within the existing literature by including details on how it confirms findings of some studies, but also adds to the field. On page 20, two paragraphs in a row begin with the word "Finally." It would be helpful to change one of these. The study is framed with the definition of noticing, as written by Jacobs et al. (2010). The discussion makes no mention of this definition beyond mentioning the attending, interpreting, and responding. I am not sure it is completely necessary to revisit Jacobs et al. (2010) in the discussion, but their work seemed important to the present study, so it may be worth considering. Also, the literature included in the beginning of the paper draws heavily on culture and this is not as present in the discussion. Adding to the discussion would be beneficial to further make the purpose of the paper more meaningful.

**Reviewer 6 – Accept**

This paper reports on detailed study of six PSTs responses to three tasks, based on watching a video in which a student can be seen to reverse the order of the y coordinates when calculating the distance between two point. The first task was about responding to the particular student; the second tasks was about using a particular diagram ('inverse right angled triangle') to teach the distance formula; the third task was to plan a lesson on introducing the distance formula.   At least one of the PSTs classified the reversal as an error. While noticing this action by the student may be worthwhile, it does seem (as the authors acknowledge) rather a minor matter in relation to student understanding of how to calculate distance. The presence of the second and third tasks could easily have influenced how the PSTs perceived the first task, and although it raises minor pedagogical issues concerning distance (and the role of absolute value), there is no connection made to the importance of sign when calculating slope.   The main thrust and perhaps the potential contribution of the paper lies in what it is that informs 'noticing'. While a number of recent distinctions are called upon to structure this, I was left really none the wiser. For example, a three-fold set of distinctions for understanding was mentioned, ignoring the substantive work by Skemp, by Sierpinska and by Pirie and Kieran among several others who prove a much more sophisticated analysis of what might be construed by the word.  That said, the paper is very clearly and authoritatively written. Everything is well laid out and presented. Its form matches that of a sophisticated article.  I found the paper disappointing, because the conclusion seemed to be that "this study confirmed that the six PST's prior orientations (including beliefs) and resources (including knowledge) informed what they noticed. However, this study found that not only what they attended but also how they interpreted what they attended and how they responded has important PCK and cultural dimensions." This is hardly surprising, and references are given to previously published equally obvious observations. I did not learn anything about what informs noticing.

Reviewer 7 - Minor revisions

This paper reports on a study aimed to investigate pre-service teachers' noticing considering two foci: the first related with the nature of student teaching and the second related with cultural dimensions. Even though the mathematical topic in the example used in the experiment (video clip) is not a very important one, as the authors acknowledge, the results show a variety of perspectives/approaches adopted by pre-school teachers in responding to 3 tasks, which are very interesting.  In the introduction, the authors clarified the goals of this study and tried to link those with some existing literature on noticing. The literature review still needs some reorganization. Especially, in presenting some ideas and definitions used in this work. For example, the authors refer to "all the three components of noticing" in the first part of the review but only in the second part do they refer that they "adhere to Jacobs, Lamb and Philipp's definition" and mention those three components.  Also, the last paragraph, just before the Methods section, doesn't make sense. Something seems to be missing and the allusion to "responding to what one notices" seems to be misplaced.  The criteria for selecting the participants are clear. Also the description of the coding scheme is comprehensible. In the analysis, some interesting examples of pre-service teachers approaches to the tasks are offered and the authors made valuable comments that explain and try to offer possible explanations for those approaches.  These results allow weaving in the discussion, some considerations/implications for teachers' training, which is important and relevant to teacher educators.  Overall, I think the authors tried to address the comments from previous reviewers. Therefore I would recommend its publication after textual revisions.