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Judul	:	Empowering mathematics teachers' ICT readiness with android applications for Bring Your Own Devices (BYOD) practice in education
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INFORMATION & COMMUNICATIONS TECHNOLOGY IN EDUCATION

Empowering mathematics teachers' ICT readiness with android applications for Bring Your Own Devices (BYOD) practice in education

Maman Fathurrohman, Hepsi Nindiasari, Nurul Anriani & Aan Subhan Pamungkas | Ah Choo Koo (Reviewing editor)

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Abstract

This research aims to provide android applications to empower mathematics teachers' information and communication technology readiness. The purpose is to facilitate them, due to availability and widely distribution of Android devices, to support them in Bring Your Own Devices (BYOD) practice in mathematics education. The method used is survey to mathematics teachers followed by design and development of the applications. The survey results show six indicators of the Information and Communication Technology (ICT) readiness: (1) understanding ICT in education, (2) curriculum and assessment, (3) pedagogy, (4) ICT, (5) organization and administration, and (6) teacher professional learning, already achieved in the surveyed area. The applications developed, Guidelinks to facilitate the use of internet-accessible resources and LDSoft to document and share teachers' learning designs, are the result of mathematics teachers' need and researchers' capabilities analysis. Both purposed for use by mathematics teachers in internet-connected environment, either at school or home, that benefit for use in Covid-19 Pandemic situation. Teachers can be empowered to optimize the use of their own devices for use in teaching and learning practices.

Keywords: technology-based learning, mathematics teachers, Bring Your Own Devices (BYOD), Android

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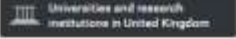
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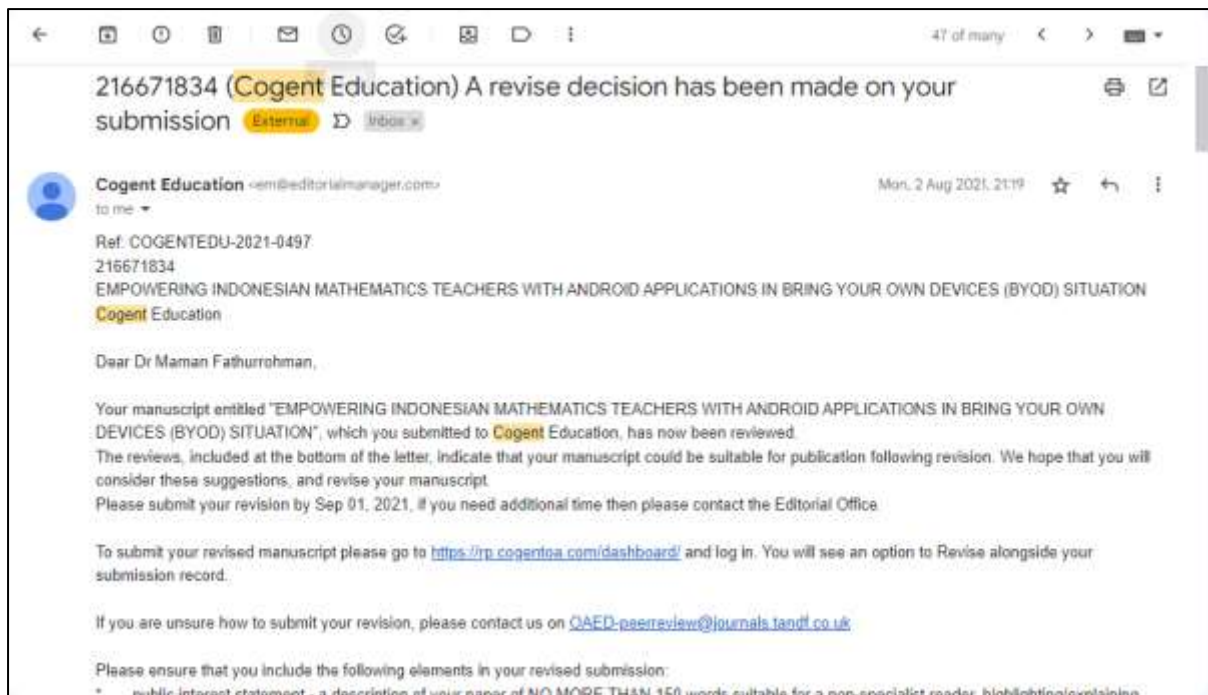
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SCOPE

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Proses Review Subtansi:



Reviewer 1:

Firstly, the article can be improved by adding more latest references in the research area, especially references within these years.

The first part of data presented - on the study of mathematics teachers' readiness of using ICT for teaching and learning.

The study data was gathered in January - February 2016 which is quite dated (6 years ago). How does this dataset able to reflect on the current ICT adoption and usage in mathematics class by teachers in Banten Province (6 districts), especially during pandemic situation? Some latest literature on this aspect will greatly improved the paper. This can be followed by some discussions on the comparison of readiness or adoption of ICT by mathematic teachers in the province.

The second part of the paper reported about the teachers' perception of mobile application, LDSoft and learning resources mobile application Guidelinks and its XML-based maps. Overall what are the special features of the apps and the theoretical aspects of these tools that can assist teaching and learning?

Discussions and the conclusion of the study is lacking. Should improve the discussions and conclusion part.

The paper requires proofreading service.

Title of the article is not currently reflecting on the main content which was more focusing on the readiness and perception of mobile application usage by the teachers. The design or co-design aspects was not much reported in the article, although the methodology of the study was focusing on design and development approach (mentioned in the abstract).

Reviewer 2:

This is an important subject matter and thank the authors for their hard work in trying to move ICT in math forward. I would encourage the authors to re-visit some general framings of their argument. It seems that many of the pieces are there but requires some careful revision to create more clarity in supporting the conclusion. I hope these comments offer a constructive springboard for further consideration & discussion among the authors.

Overall issues/questions:

Was the guidestar app developed before, in parallel or after this survey?

Was this survey independent of or as a part of 'field testing' of the guidestar app?

Who actually developed the guidestar app? Was it the same team that administered the survey?

After reading the full paper, in hindsight, it seems like the goal is to support the advancement/support for guidestar with this survey. Is that correct?

The idea of guidestar as a digital platform to help teachers share math learning designs is a really nice one and think readers would very much benefit from understanding more about this- but it's not mentioned until end and not explained or discussed in depth.

Questions that would be useful to have answered-- how it is designed to work and what what level of ICT capacity does a teacher need to successfully use it? (for ex, is it easy enough that if a teacher can email/ social media, they would be able to implement this; if a teacher can use powerpoint or excel, they can use this or does it require specialized training for teachers to effectively use it?)

*Consider what is the justification of investment of ICT in math in general or in guidestar- The survey offers useful insights into current use- but suggest authors revisit the several factors required to advance ICT in math curriculum. This paper doesn't need to have a solution for all of it but would be important to at least map out what those other moving parts are--

*How does the potential implementation of guidestar work/differ if teachers are accessing it at home to plan curriculum versus on site school connectivity to work with students? In other words, what is the explicit benefit to policy makers/ school administrators to work towards better internet connectivity on site for schools? Alternatively, what kind of support should schools provide to ensure teachers can access this tool at home (e.g., data charges etc).

Do the authors have recommendations for what a successful roll out of guidestar would be in terms of policy, funding, and training support to make it an effective tool for teachers? If so, this would be very good to include in the conclusion.

Suggest some points/questions for authors to clarify in this important work-

-Distinguishing between use of ICT as a tool for communication in classroom (powerpoint, etc) vs as a tool for curriculum development.

Guidestar seems to focus more on helping teachers use for curriculum development, while the survey seems to focus more on frequency of existing use. Both are obviously complementary but suggest the study would provide a stronger argument for guidestar if these different dimensions were teased apart farther. 'Readiness' criteria can support the idea but can not justify it alone- in fact, if anything would suggest the low numbers of use in internet access for teachers (1-2/month and less) in regard to curriculum development is strong rationale to say it's not being optimized and that this is a critical gap at both local and national levels.

An example of a slightly modified framing of the argument to consider- if the goal is to support greater ICT in math education—

1. What exists / how do teachers use ICT now in the context of current connectivity/teacher capacity? (Also consider what can be reported on any changes to this situation during COVID?)
2. How would guidestar improve their teaching?
3. What are the attitude and capacity gaps that need to be bridged and discuss the feasibility of this (this can be the basis of recommendations required for more institutional support of ICT in math education vs leaving it to individual teachers to be innovative)...

Specific Comments by Section:

Introduction- throughout text there is a need for editing for English grammar. Many are quick fixes such as missing articles/ words ('This condition may useful to cover...')

Introduction- text should be re-assessed for clarity. Some sentences aren't clear int rems of what the authors mean to say- for example, the first sentence of the introduction. Reader has to piece the meaning together..

Introduction- reference to Fathurrohman (2014) and new technique- would be helpful to reader to have a paragraph here that positions key advancements in how technology has been applied to improve math curriculum over the last few years.

Methods- nice overview of the rationale and basis for method used but no information about how the survey in the 6 districts in Indonesia were carried out. What was the recruitment strategy for the survey? What was the sampling strategy used (e.g., snowball, random, etc etc)? What was the response rate? What did you do with missing or skipped responses? Were there any respondents that were removed from the sample for any reason? How was the survey administered? Online, offline? Who administered it? What was in the survey (what parameters were used to assess teacher capacity?) In general, this section should help the reader understand how the survey respondents were selected and how the survey was carried out and what were the metrics used to measure teacher capacity. (ex. First 2 sentences of needs analysis should be in methods section.)

Results & Discussion- UNESCO ICT six aspects of ICT competencies- suggest this is critical info to frame the paper- would be helpful framing to include this in the introduction instead of results/discussion section. It's never explicitly stated whether these 6 aspects were used in the Indonesia survey. If this is the case, then it is strongly suggested to introduce this key idea in the introduction, make it's explicit use in this survey clear in the methods section and reference it in the context of the specific results in the results section.

Needs Analysis section- this section should be in referred to as results- a) teachers have knowledge/ can implement policy - great info but no where have authors explained what the policy actually is or in the context of the bring your own device strategy- and therefore, the reader is left with little way to interpret these results.

'Most teachers (304/551) have device used for learning math as much as 1-2 times per month' (Is there data to report on what is the barrier to more frequent use?) Are there demographic or other differences between groups using it 1-2/month versus 5+ times/ month?

Table 10. Not clear what 'teachers follow the activities of community learning math teachers' means...

Technology-based kit: How it works? (this should be an annex)
 School implementation & teachers response- this info (teacher age breakdown- should be in results section)
 Generalization & Broader Impact section- this is should be all conclusion section.

Despite the number of comments, please do let me reiterate the support for this study and encourage the authors to revisit the various pieces to create a stronger impact and justification for advancing ICT in mathematics.

Proses Revisi:

Ref: COGENTEDU-2021-0497R1

216671834

EMPOWERING INDONESIAN MATHEMATICS TEACHERS WITH ANDROID APPLICATIONS IN BRING YOUR OWN DEVICES (BYOD) SITUATION

Cogent Education

No	Reviewers/Editors' Comments	Revision
1	<p>Title, Abstract and Introduction – overall evaluation Reviewer 2: Sound</p> <p>Methodology / Materials and Methods – overall evaluation Reviewer 2: Unsound or fundamentally flawed</p> <p>Objective / Hypothesis – overall evaluation Reviewer 2: Unsound or fundamentally flawed</p> <p>Figures and Tables – overall evaluation Reviewer 2: Sound</p> <p>Results / Data Analysis – overall evaluation Reviewer 2: Sound with minor or moderate revisions</p> <p>Interpretation / Discussion – overall evaluation Reviewer 2: Sound with minor or moderate revisions</p> <p>Conclusions – overall evaluation Reviewer 2: Sound with minor or moderate revisions</p> <p>References – overall evaluation Reviewer 2: Sound</p> <p>Compliance with Ethical Standards – overall evaluation Reviewer 2: Sound</p>	<p>As suggested by reviewers, the title, abstract, and introduction, list of figures and tables, and references are already sound. The authors keep these original sections with only minor changes/improvement, including change of title and abstract as required and additional lists of recent relevant articles in references.</p> <p>As suggested by reviewers, the methodology dan objective sections in this R1 revised article, revised by authors significantly. The revision highlighted with yellow in R1 revised article..</p> <p>Authors also improve the results, discussions and conclusions sections as suggested through the following reviewers' comments of No 2 to 23 (detail follows)</p> <p>All changes/improvements are highlighted in yellow in the R1 manuscript file.</p>

	<p>Writing – overall evaluation Reviewer 2: Sound with minor or moderate revisions</p> <p>Supplemental Information and Data – overall evaluation Reviewer 2: Not applicable</p>	
2	<p>Reviewer 2: This is an important subject matter and thank the authors for their hard work in trying to move ICT in math forward. I would encourage the authors to re-visit some general framings of their argument. It seems that many of the pieces are there but requires some careful revision to create more clarity in supporting the conclusion.</p>	<p>Thank you for the appreciation. Authors acknowledge the important essence of this article to move ICT in math forward by publication of this article as soon as possible. In regard to this purpose, the authors improve quality of this R1 revised article as required based on reviewers' comments.</p>
2	<p>Was the guidestar app developed before, in parallel or after this survey? Was this survey independent of or as a part of 'field testing' of the guidestar app? Who actually developed the guidestar app? Was it the same team that administered the survey? After reading the full paper, in hindsight, it seems like the goal is to support the advancement/support for guidestar with this survey. Is that correct?</p>	<p>The guidelinks application, not guidestar, developed after the survey. The survey is independent regarding to know teachers' readiness with ICT. Part of survey results used to justify the development of android applications (one of them is guidelinks applications). Researchers hired computer programmers to develop the application. The applications is also developed to response survey results.</p>
3	<p>The idea of guidestar as a digital platform to help teachers share math learning designs is a really nice one and think readers would very much benefit from understanding more about this- but it's not mentioned until end and not explained or discussed in depth.</p>	<p>The idea of guidelinks and learning design sharing between teachers added in early discussion with more depth and concrete examples.</p>
4	<p>Questions that would be useful to have answered--how it is designed to work and what what level of ICT capacity does a teacher need to successfully use it? (for ex, is it easy enough that if a teacher can email/ social media, they would be able to implement this; if a teacher can use powerpoint or excel, they can use this or does it require specialized training for teachers to effectively use it?)</p>	<p>The design on how it is work, and the level of ICT capacity does a teacher need to successfully use it added in discussion. There is no need of training for teachers to effectively use it.</p>
	<p>*Consider what is the justification of investment of ICT in math in general or in guidestar- The survey offers useful insights into current use- but suggest authors revisit the several factors required to advance ICT in math curriculum. This</p>	<p>Added justification of investment of ICT in math in general. Several factors required to advance ICT in math are revisited</p>

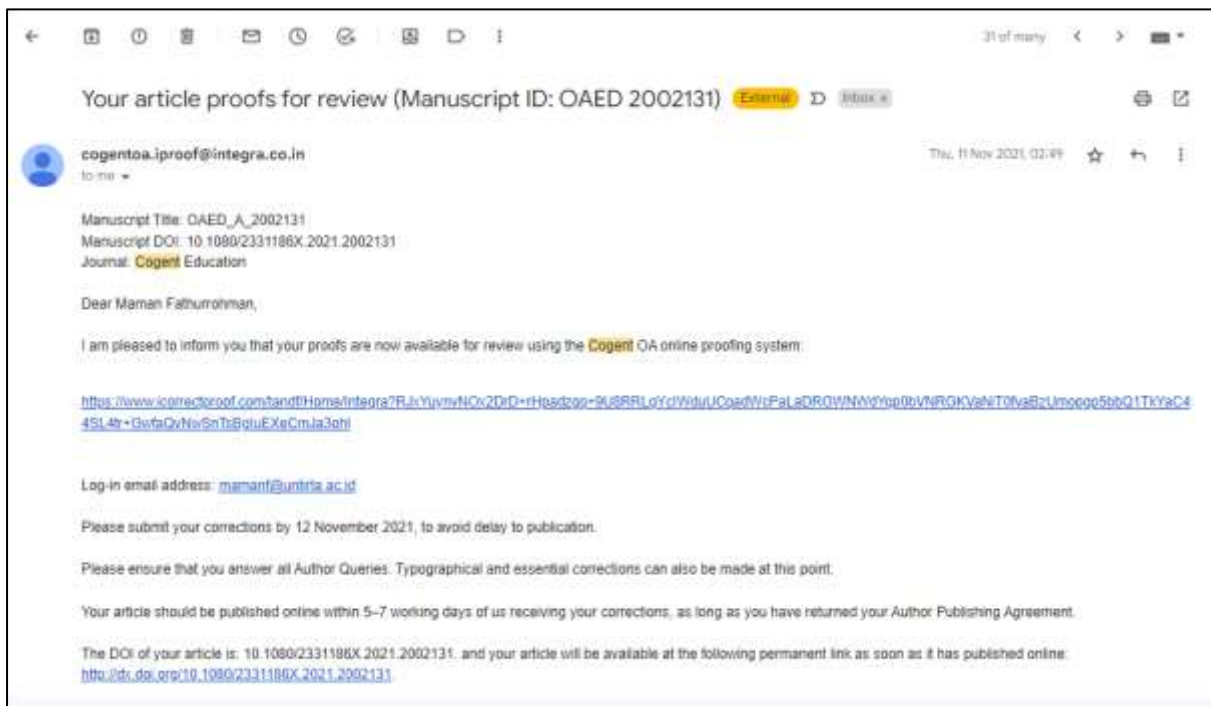
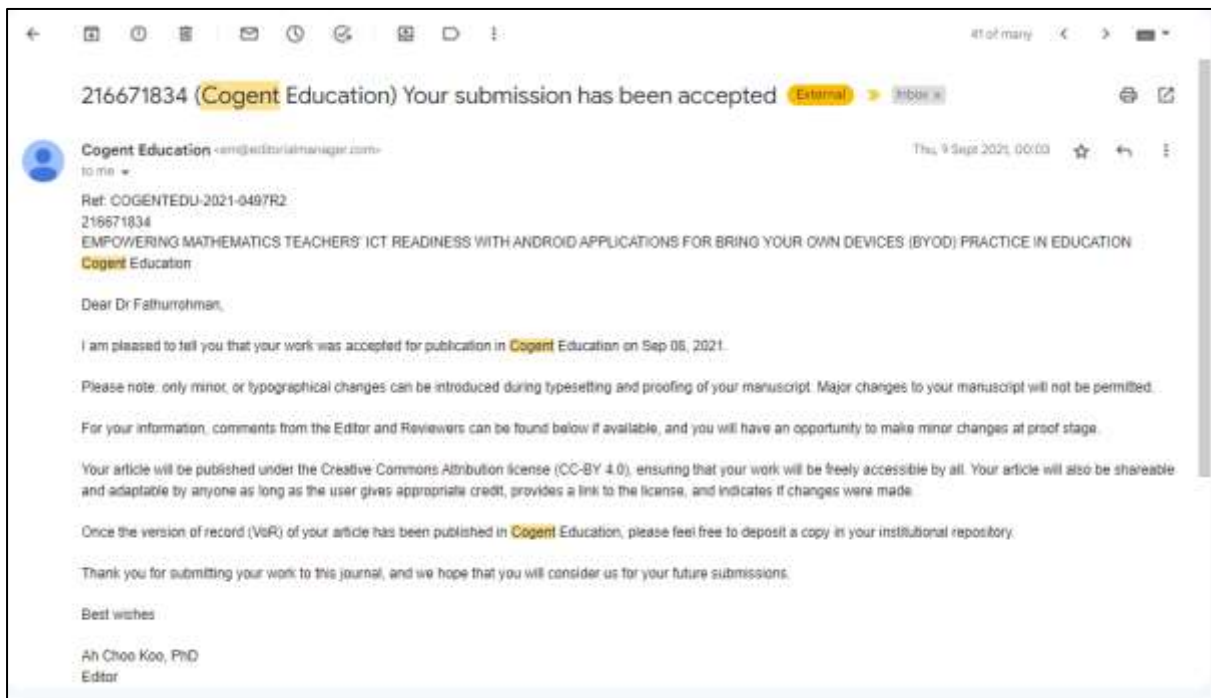
	<p>paper doesn't need to have a solution for all of it but would be important to at least map out what those other moving parts are--</p>	
	<p>*How does the potential implementation of guidestar work/differ if teachers are accessing it at home to plan curriculum versus on site school connectivity to work with students? In other words, what is the explicit benefit to policy makers/ school administrators to work towards better internet connectivity on site for schools? Alternatively, what kind of support should schools provide to ensure teachers can access this tool at home (e.g., data charges etc). Do the authors have recommendations for what a successful roll out of guidestar would be in terms of policy, funding, and training support to make it an effective tool for teachers? If so, this would be very good to include in the conclusion.</p>	<p>Further discussion on potential implementation of teachers accessing at home and at school compared. Potential support from school for BYOD also included. Comparison with discussion and also recommendation for successful roll out added</p>
	<p>-Distinguishing between use of ICT as a tool for communication in classroom (powerpoint, etc) vs as a tool for curriculum development. Guidestar seems to focus more on helping teachers use for curriculum development, while the survey seems to focus more on frequency of existing use. Both are obviously complementary but suggest the study would provide a stronger argument for guidestar if these different dimensions were teased apart farther. 'Readiness' criteria can support the idea but can not justify it alone- in fact, if anything would suggest the low numbers of use in internet access for teachers (1-2/month and less) in regard to curriculum development is strong rationale to say it's not being optimized and that this is a critical gap at both local and national levels.</p>	<p>Stronger argument provided, in regard to the use of the applications.</p>
	<p>An example of a slightly modified framing of the argument to consider- if the goal is to support greater ICT in math education— 1. What exists / how do teachers use ICT now in the context of current connectivity/teacher capacity? (Also consider what can be reported on any changes to this situation during COVID?) 2. How would guidestar improve their teaching? 3. What are the attitude and capacity gaps that need to be bridged and discuss the feasibility of this (this can be the basis of recommendations required for more institutional support of ICT in math education vs leaving it to individual teachers to be innovative)..</p>	<p>Framing added, including how teachers can use the application in COVID situation to improve access to learning resource in teaching (1 and 2). The feasibility (3) also included.</p>
	<p>Introduction- throughout text there is a need for editing for English grammar. Many are quick fixes such as missing articles/ words ('This condition</p>	

	<p>may useful to cover...’)</p> <p>Introduction- text should be re-assessed for clarity. Some sentences aren’t clear int rems of what the authors mean to say- for example, the first sentence of the introduction. Reader has to piece the meaning together..</p> <p>Introduction- reference to Fathurrohman (2014) and new technique- would be helpful to reader to have a paragraph here that positions key advancements in how technology has been applied to improve math curriculum over the last few years.</p>	<p>Editing of the article for correction and improvement. Link to the reference of the relevant previous technology improved.</p>
	<p>Methods- nice overview of the rationale and basis for method used but no information about how the survey in the 6 districts in Indonesia were carried out. What was the recruitment strategy for the survey? What was the sampling strategy used (e.g., snowball, random, etc etc)? What was the response rate? What did you do with missing or skipped responses? Were there any respondents that were removed from the sample for any reason? How was the survey administered? Online, offline? Who administered it? What was in the survey (what parameters were used to assess teacher capacity?) In general, this section should help the reader understand how the survey respondents were selected and how the survey was carried out and what were the metrics used to measure teacher capacity. (ex. First 2 sentences of needs analysis should be in methods section.)</p>	<p>Methodology section improved by adding more information about survey of six districts, including the recruitment strategy, sampling, response rate, the person involved, etc.</p>
	<p>Results & Discussion- UNESCO ICT six aspects of ICT competencies- suggest this is critical info to frame the paper- would be helpful framing to include this in the introduction instead of results/discussion section. It’s never explicitly stated whether these 6 aspects were used in the Indonesia survey. If this is the case, then it is strongly suggested to introduce this key idea in the introduction, make it’s explicit use in this survey clear in the methods section and reference it in the context of the specific results in the results section.</p>	<p>UNESCO ICT six aspects of ICT now introduced in the introduction section to frame the article. Also its relation to the survey.</p> <p>The discussion also conducted in the methodology section.</p> <p>Explicit paragraph on UNESCO six aspects of ICT Competencies and policy of BYOD added</p>
	<p>Needs Analysis section- this section should be in referred to as results- a) teachers have knowledge/ can implement policy - great info but no where have authors explained what the policy actually is or in the context of the bring your own device strategy- and therefore, the reader is left with little way to interpret these results.</p>	<p>Need analysis section moved to results. Further explanation on the policy and other discussion that lead to BYOD (Bring Your Own Devices) strategy.</p>

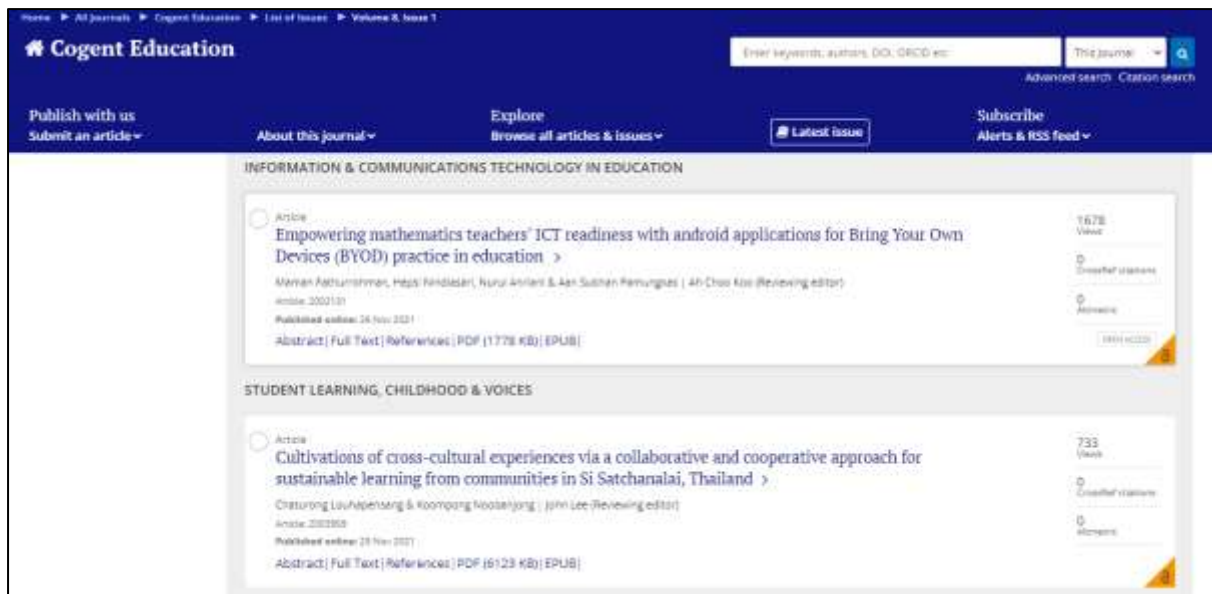
	Most teachers (304/551) have device used for learning math as much as 1-2 times per month' (Is there data to report on what is the barrier to more frequent use?) Are there demographic or other differences between groups using it 1-2/month versus 5+ times/ month?	Further explanation on the barrier and comparison of demographic between 1-2 times per month and 5+ use provided.
	Table 10. Not clear what 'teachers follow the activities of community learning math teachers' means...	More explanation added in the article
	Technology-based kit: How it works? (this should be an annex) School implementation & teachers response- this info (teacher age breakdown- should be in results section) Generalization & Broader Impact section- this is should be all conclusion section.	Section on Technology-based kit: How it works move as annex of the article. Explanation of schools implementation and teachers responses moved to results section Part of generalization and broader impact become conclusion
	Firstly, the article can be improved by adding more latest references in the research area, especially references within these years.	Latest and relevance references already added
	The first part of data presented - on the study of mathematics teachers' readiness of using ICT for teaching and learning. ... How does this dataset able to reflect on the current ICT adoption and usage in mathematics class by teachers in Banten Province (6 districts), especially during pandemic situation? Some latest literature on this aspect will greatly improved the paper. This can be followed by some discussions on the comparison of readiness or adoption of ICT by mathematic teachers in the province.	As suggested by reviewers, the data set now reflected to current ICT adoption and usage in mathematics class by teachers, including in COVID-19 pandemic situations. Latest relevan literature added. Added discussion on the comparioson of readiness or adoption of ICT by mathematics teachers.
	The second part of the paper reported about the teachers' perception of mobile application, LDSOft and learning resources mobile application Guidelinks and its XML-based maps. Overall what are the special features of the apps and the theoretical aspects of these tools that can assist teaching and learning?	Special features of Guidelinks and LDSOft detailed in a table in the article. The theoretical aspects (scenarios) of use of these tools for assist in teaching and learning also explained in details.
	Discussions and the conclusion of the study is lacking. Should improve the discussions and conclusion part. The paper requires proofreading service.	Discussion and conclusion parts already improved (highlighted in yellow in the article), including the proof carefully conducted page by page.
	Title of the article is not currently reflecting on the main content which was more focusing on the readiness and perception of mobile application usage by the teachers. The design or co-design	Page 1: Title revised to "Empowering mathematics teachers's ICT readiness with

	<p>aspects was not much reported in the article, although the methodology of the study was focusing on design and development approach (mentioned in the abstract).</p>	<p>android applications for Bring Your Own Devices (BYOD) practice in education”. The abstract also slightly improved relevant to the title. The research design already improved and reported in detail in the article.</p>
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INFORMATION & COMMUNICATIONS TECHNOLOGY IN EDUCATION | RESEARCH ARTICLE

Empowering mathematics teachers' ICT readiness with android applications for Bring Your Own Devices (BYOD) practice in education

Maman Fathurohman^{1*}, Heps Nindiasari¹, Nurul Anriani¹ and Aan Subhan Pamungkas¹

Abstract: This research aims to provide android applications to empower mathematics teachers' information and communication technology readiness. The purpose is to facilitate them, due to availability and widely distribution of Android devices, to support them in Bring Your Own Devices (BYOD) practice in mathematics education.

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