**Appendix 1. Factor analysis related results**

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| --- | --- |
| **Table A1.1** Kaiser-Meyer-Olkin (KMO) measure and Bartlett’s test.  A screenshot of a computer  Description automatically generated  **Table A1.2** Reliability statistics  A close-up of a graph  Description automatically generated | |
| **Table A1.3** Total variance.  A screenshot of a spreadsheet  Description automatically generated | **Table A1.4** Rotated component matrix.  A table of numbers with numbers  Description automatically generated |

**Appendix 2. Themes and codes from interviews**

**Table A2** Themes and codes belonging to each theme.

|  |  |
| --- | --- |
| **Theme** | **Codes** |
| Theme 1: Improving course lessons using AR | Practical side (of lessons) Improve lessons via AR Unofficial courses Parts of human body Chemistry (atoms) lessons Biology (animal classification) lessons Science lessons Visualize results 6th grade 9th and 10th grades Math (subject of) Technology Engineering 11th grade (suitable for) courses requiring imagination 3D drawings Advantage: superimposed in real environment Visualize shape of tent (engineering design course) Link to AR app for each lesson Transform traditional textbooks Visualize: volcanoes, skeletons, planets Geo-coordinates to famous battle COVID-19 |
| Theme 2: The need for teacher training | Personal effort Training teachers for AR Training workshop on AR 90 teachers trained Personal research Lack of sufficient training Precepted (by teachers, school) as a difficult technology Self-research (of apps, tutorials) Learn about AR via YouTube tutorials Not enough training (teacher) Inspired by Pokeman game |
| Theme 3: School and Ministry support | Integrate into education (ministry asks) Financial support needed for tablets School lack knowledge of AR No smartphone in classroom policy School support with buying needed devices External funds (projects) to buy devices |
| Theme 4: Infrastructure and device needs | Mobile phones Work in groups, lack of iPads Strong internet for some apps No smartphone in classroom policy Internet speed insufficient in school Student smartphone old for new AR apps (students) owning smartphones for AR Internet available Smartphones available Internet connection is an issue |
| Theme 5: Content and apps availability | Already developed apps Many free apps Paper cards 30 free apps Many apps work offline Hologram technology Needed increase of availability of free apps Satisfactory amount of free apps Expensive apps (arcode package, math) Existing free apps |
| Theme 6: Positive student attitude | Students motivated Increased students’ attention Increased student participations Increased student interaction Fun and exciting Involve all students Difficult to students (in the beginning) Increase ability to imagine Students interested Students lack experience (students) challenge with new teaching method Enjoyable Easier to imagine Improve lessons Advantage: superimposed in real environment |

**Appendix 3. Survey structure**

**Table A3** Structure and content of the survey.

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| --- | --- | --- |
| Construct | Questions | Source |
| Attitude towards using AR | 1. The use of AR can be beneficial for students’ development 2. Students need to know how to use AR applications for their education 3. AR application material is better than traditional educational material 4. AR supports children’s learning 5. The use of AR make students more interested and engaged in the subject matter 6. The use of AR, if not properly administered, may lead the child to less social contact with other children in classroom | (Weng et al., 2018) |
| Professional development (training) | 1. I would like more information from experts on finding AR applications to support my students’ learning 2. I would like more information on the frequency of use of AR to be beneficial for the development of my students  would like more information about the age at which my students are recommended to be involved in AR 3. I would appreciate more support and training about the convenient age of students to learn with AR 4. I would like to introduce AR in the school and use it in my students’ education 5. Providing relevant training would encourage you to use   AR in teaching/learning   1. Securing the necessary resources would encourage you to use AR in teaching/learning | Rhodes and Beneicke ([2003](https://www.tandfonline.com/doi/abs/10.1080/13674580300200205)) |
| Intention to use | 1. I am curious about how technologies such as Augmented Reality, Artificial Intelligence, 3-D printers and Virtual Robotics can enhance learning? 2. I believe that using AR would make my learning/teaching process more efficient 3. I believe that using AR would make my learning/teaching process more convenient 4. I think I would save time using AR while learning/teaching 5. I believe that, in general, the use of AR in my learning teaching process would be helpful 6. Using an AR can improve my learning/teaching performance | (Burton-Jones & Hubona, 2005)  (Davis, 1989) |
| Ease of access | 1. It is easy to learn how to use AR for learning/teaching 2. I think it would be easy to use AR in my learning/teaching process 3. I think using AR will be a waste of my time 4. I think the use of AR is an inefficient way of learning/teaching | (Burton-Jones & Hubona, 2005)  (Davis, 1989)  (Akçayır, M., & Akçayır, G. (2017)  (Venkatesh & Davis, 2000) |