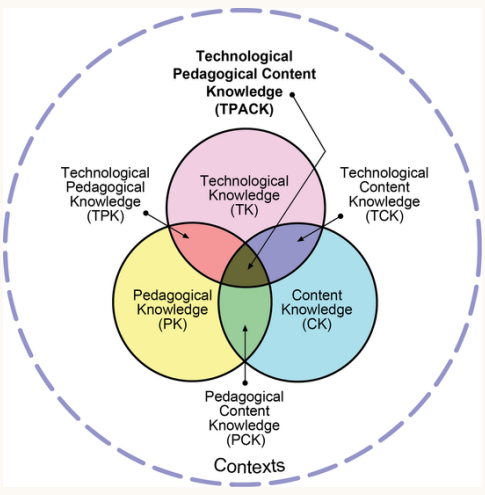
Technology Integration Models

Eva Li

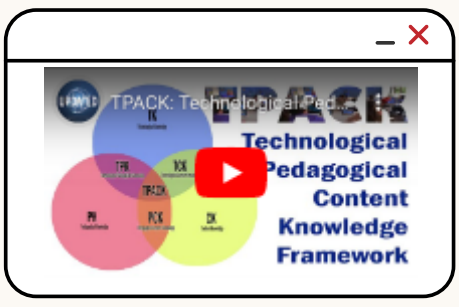
TPACK



Technological Pedagogical Content Knowledge (TPACK) attempts to identify the nature of knowledge required by teachers for technology integration in their teaching, while addressing the complex, multifaceted and situated nature of teacher knowledge.

History & Practice

- TPACK framework was firstly developed by Shulman (1986) and then expanded by Mishra & Koehler (2006) by adding the technology element.
- TPACK is the most commonly used technology integration model amongst educational researchers.
- The goal is to provide educators with a framework that is useful for understanding technology's role in the educational process.



Application & Example

- **Pedagogical Content Knowledge (PCK)**—understanding the best practices for teaching specific content to your specific students
  - Example: A teacher pre-teaches key words and uses visual aids when teach a new topic to ESL students.
- **Technological Content Knowledge (TCK)**—knowing how the digital tools available to you can enhance or transform the content, how it's delivered to students, and how your students can interact with it.
  - Example: A teacher uses an instructional video for a topic that they used to model on the board.
- **Technological Pedagogical Knowledge (TPK)**—understanding how to use your digital tools as a vehicle to the learning outcomes and experiences you want.
  - Example: A teacher asks students to design a Mars Base on Minecraft as part of end of unit assessments.

Pros

- This framework can be used by researchers to understand the interplay between content knowledge, pedagogical knowledge, and technical knowledge that teachers display.
- It allows teachers, researchers, and teacher educators to move beyond oversimplified approaches that treat technology as an "add-on" instead to focus again, and in a more ecological way.

Cons

- TPACK attempts to be a comprehensive model but it relies on three interconnected variables.
- Teachers have varying degrees of content knowledge, pedagogical skills and technology experience.
- Some might view it as too complex and not very practically useful.
- Inadequate post-training support may discourage the use of technology.

References

Kimmons, R. (n.d.). Technology integration. The K-12 Educational Technology Handbook. Retrieved February 12, 2023, from https://edtechbooks.org/k12handbook/technology_integration
McGraw Hill Canada | what is tpack theory and how can it be used in the ... (n.d.). Retrieved February 12, 2023, from https://www.mheducation.ca/blog/what-is-tpack-theory-and-how-can-it-be-used-in-the-classroom/
Mkoehler. (2017, June 9). TPACK Explained. TPACK.ORG. Retrieved February 12, 2023, from http://matt-koehler.com/tpack2/tpack-explained/
Powerschool.com. (n.d.). Retrieved February 12, 2023, from https://www.powerschool.com/blog/the-tpack-framework-explained-with-classroom-examples/

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RAT

- RAT is an assessment framework for understanding technology's role in teaching, learning and curricular practices, originally developed for PK-12 education, but it has been applied in higher education, especially in pre-service teacher education.
- The original purpose of the RAT framework was to introduce it as a self-assessment for preservice and inservice teachers to increase critical technological decision-making.

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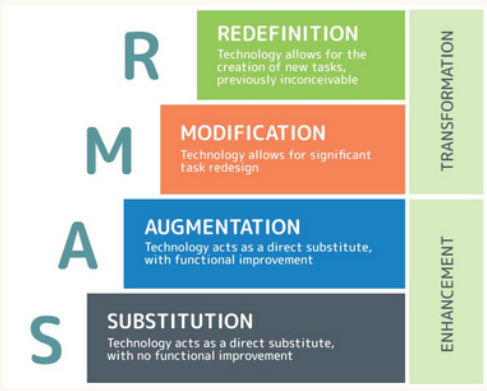
SAMR

- SAMR is an acronym for substitution, augmentation, modification, and redefinition (Puentedura, 2003).
- To compare it to RAT, substitution and replacement both deal with technology use that merely substitutes or replaces previous use with no functional improvement on efficiency.
- Redefinition and transformation both deal with technology use that empowers teachers and students to learn in new, previously impossible ways.

- Technology as Replacement/Substitution
  - e.g. Digital worksheet on Google Classroom
- Technology as Amplification
  - Augmentation: e.g. End of unit test on Google Form
  - Modification: e.g. Students create an informative video presentation in place of a standard oral presentation.
- Technology as Transformation/Redefinition
  - e.g. Student create project project showcase on Google Sites and share with the wider audience.



Pros

- Both RAT and SAMR have value for teachers as self-reflection tools. They are helpful for leading educators to consider the question:
  - What effect is using the technology having on my practice?
- Schools can use RAT and SAMR as evaluation frameworks to examine technology use and curriculum design.

Cons

- If the technology is merely replacing or substituting previous practice, then it is a less meaningful use of technology.
- Some researchers claim that a key problem with SAMR is the absence of a theoretical basis and peer-reviewed literature for SAMR.
- RAT model focuses more on technology in teaching but fails to address technology in learning.

References

Admin. (2016, August 23). On the value or otherwise of SAMR, rat etc.. Some assemblage required. Retrieved February 12, 2023, from https://djon.es/blog/2016/08/23/on-the-value-or-otherwise-of-samr-rat-etc/
Best, J. (2022, September 21). The SAMR model explained (with 15 practical examples). 3P Learning. Retrieved February 12, 2023, from https://www.3plearning.com/blog/connectingsamrmodel/
Kimmons, R. (n.d.). Technology integration. The K-12 Educational Technology Handbook. Retrieved February 12, 2023, from https://edtechbooks.org/k12handbook/technology_integration
R.A.T. model. TechEdges. (2019, December 9). Retrieved February 12, 2023, from https://techedges.org/r-a-t-model/

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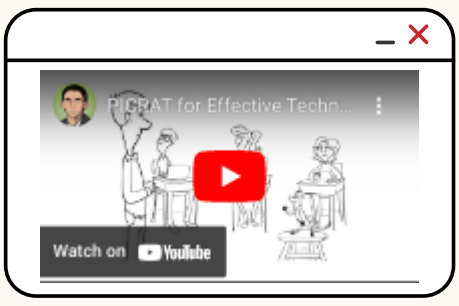
PICRAT



Recently developed by Royce Kimmons and building off the RAT model, **PICRAT** assumes that there are two foundational questions that a teacher must ask about any technology use in their classrooms. These include:

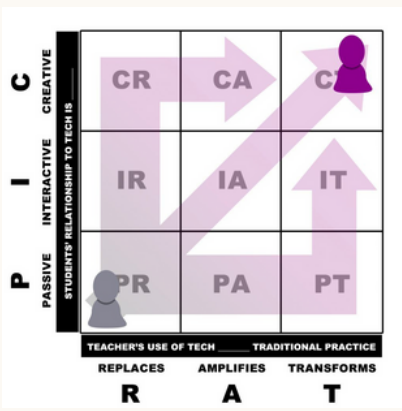
1. What is the **students'** relationship to the technology? (PIC: Passive, Interactive, Creative)
2. How is the **teacher's** use of technology influencing traditional practice? (RAT: Replace, Amplify, Transform)

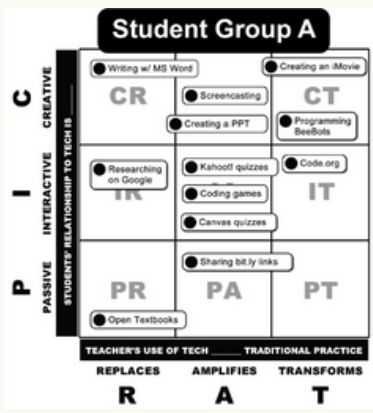
Pros

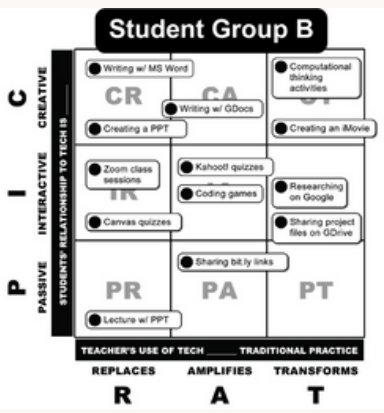
- PICRAT is a more student-focused, pedagogy-driven model that can be effective for the specific context of teacher education.
- It is rather comprehensible and usable by teachers as it guides the most worthwhile considerations for technology integration.

Cons

- Though Royce Kimmons encourages teachers to evolve their practice to continually move from the bottom-left (PR) to the top-right (CT) of the grid, some may argue that there is still value in PR type of activities.
- Some may also criticise the PICRAT model for overlooking the border picture and not comprehensive enough for research purposes.



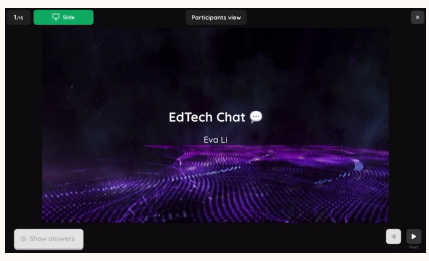




Proposed Model PICRAT

- PICRAT model is by far the best fit for my school and my current teaching context, for these following reasons:
  - This well-balanced model examines the interplay of both students' and teacher's use of technology.
  - The diagram provides teachers with a visual and practical way of reflecting on current practices and planning for future teaching.
  - It is a practical framework for school-wide evaluation and discussions on EdTech integrations.

A peer-sharing session where I used PICRAT model to discuss on how EAL teachers can use EdTech to support teaching and learning.



My presentation slides on Quizizz lesson to support the discussion around PICRAT model and our teaching practice.

References

Kimmons, R. (n.d.). Technology integration. The K-12 Educational Technology Handbook. Retrieved February 12, 2023, from https://edtechbooks.org/k12handbook/technology_integration

Kimmons, R. (n.d.). The PICRAT model for technology integration in teacher preparation. CITE Journal. Retrieved February 12, 2023, from https://citejournal.org/volume-20/issue-1-20/general/the-picrat-model-for-technology-integration-in-teacher-preparation/

Kisselburgh, K. (2021, August 9). Technology in the modern age of teaching. ArcGIS StoryMaps. Retrieved February 12, 2023, from https://storymaps.arcgis.com/stories/aba4a2150a0a49f79df547963bcb11fe