Engineering Collaboration for Online and Remote Education

An E-CORE Quick Guide to

Web-Based Collaborative Design Tools

CEEA ACEG
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ASSOCIATION CANADIENNE DE L'ÉDUCATION EN GÉNIE

This Quick Guide is for instructors of engineering design courses/projects. Given the remote learning conditions, there is a need to facilitate and support student teams' ability to collaborate as closely as possible to the benefits of working together in person. To continue the conversation on this topic, visit the Web-Based Collaborative Design Tools Discussion Forum thread.

Conceptual Design

Collaborative live whiteboards:
- Miro
- Google Jamboard
- WhiteboardFox

Brainstorming/Concept generation:
- Miro
- Padlet

Concept selection:
- Padlet
- Miro
- Tricider

Systems mapping:
- Draw.io
- Lucid Chart
- Kumu.io
- Sketchboard.io

Preliminary Design, Analysis and Detailed Design

Electronics:
- Tinkercad Circuits

Mechanical CAD:
- OnShape
- Fusion 360
- Tinkercad 3D Design

Product Data Management
- GrabCad Workbench
- Solidworks PDM

Code:
- GitHub
- GitLab
- Visual Studio Code

Not Collaborative, but Free for Student Personal Installation

- ANSYS Student Package
- Autodesk design software
- PTC Design Software

Needs Analysis and Problem Definition

Systems mapping:
- Draw.io
- Lucid Chart
- Kumu.io
- Sketchboard.io

Team Health Check

- TeamRetro
- iPeer
- ITP Metrics

Project Planning, Decision Making and Management

- Trello
- Asana
- Microsoft Project
- Basecamp
- Monday.com

$	Low cost / free for students or small teams (please check institution for full licences)
V	Version management AND/OR Tracking change history
👥	Synchronous collaboration

Notes to instructors:

- Each University may have different institutional licences; some tools are available for free to students to individually download/access
- Students may be familiar with particular tools; asking them to learn a new tool may require prep time/resources
- Most tools will have their databases in the USA. Some institutions may limit the choices to providers who can have the data stored at the institution or in Canada, as well as meet particular privacy policy requirements
- Remote desktop apps or secure VPN clients can give students access to the university's licenced software
- Different tools may have different levels of sharing an individual's or a team's work with external partners (e.g. clients)
- Please check there is a reasonably good process for managing access and editing. "Live' editing is convenient but can cause overwriting conflicts.
- Version/change history can allow you to see evidence of individual members contributing to the work.
- There are many resources available to incorporate sustainability considerations into the design process. One good review of sustainable design processes can be found HERE. A summary of sustainability considerations is included in Appendix III from the same paper.
- For general teamwork support, see other resources on the E-CORE Resources page.

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