

# webapplication react+vite, firebase

It is a productivity app for the first year students at Erasmus Applied science to go through the exercises of programming essentials 1.

Created by: Nolween Sine

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Context of use: Education

Level of education: Bachelor

# Technology Impact Cycle Tool

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## Impact on society

What impact is expected from your technology?

*This category is only partial filled.*

### **What is exactly the problem? Is it really a problem? Are you sure?**

any first-year ICT students (specifically in Programming Essentials 1) struggle with a lack of self-discipline and motivation for repetitive coding exercises. The frustration of falling behind on coursework, leading to procrastination and ultimately high failure rates. The frustration of falling behind on coursework, leading to procrastination and ultimately high failure rates). Yes. By transforming education into a motivating experience, we increase success rates and reduce student stress.

### **Are you sure that this technology is solving the RIGHT problem?**

*This question has not been answered yet.*

### **How is this technology going to solve the problem?**

*This question has not been answered yet.*

### **What negative effects do you expect from this technology?**

*This question has not been answered yet.*

### **In what way is this technology contributing to a world you want to live in?**

*This question has not been answered yet.*

### **Now that you have thought hard about the impact of this technology on society (by filling out the questions above), what improvements would you like to make to the technology? List them below.**

*This question has not been answered yet.*

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## Hateful and criminal actors

What can bad actors do with your technology?

*This category is only partial filled.*

### **In which way can the technology be used to break the law or avoid the consequences of breaking the law?**

Yes. By transforming education into a motivating experience, we increase success rates and reduce student stress. Students might attempt to manipulate the TasksApi or DevApi (e.g., via scripts) to mark tasks as completed without actually performing the work. The system could be used to create a false sense of progress for teachers, while the student's actual knowledge remains insufficient.

### **Can fakers, thieves or scammers abuse the technology?**

*This question has not been answered yet.*

### **Can the technology be used against certain (ethnic) groups or (social) classes?**

*This question has not been answered yet.*

### **In which way can bad actors use this technology to pit certain groups against each other? These groups can be, but are not constrained to, ethnic, social, political or religious groups.**

*This question has not been answered yet.*

### **How could bad actors use this technology to subvert or attack the truth?**

*This question has not been answered yet.*

### **Now that you have thought hard about how bad actors can impact this technology, what improvements would you like to make? List them below.**

*This question has not been answered yet.*

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## Privacy

Are you considering the privacy & personal data of the users of your technology?

*This category is only partial filled.*

### **Does the technology register personal data? If yes, what personal data?**

Yes, the technology registers personal data through Firebase Authentication and the UsersApi. Name, email address, study progress (courses, modules, tasks), and unique User IDs (UID). o explicit data on ethnicity or health is collected, but academic results are considered sensitive information under GDPR.

### **Do you think the technology invades the privacy of the stakeholders? If yes, in what way?**

*This question has not been answered yet.*

### **Is the technology is compliant with prevailing privacy and data protection law? Can you indicate why?**

*This question has not been answered yet.*

### **Does the technology mitigate privacy and data protection risks/ concerns (privacy by design)? Please indicate how.**

*This question has not been answered yet.*

### **In which way can you imagine a future impact of the collection of personal data?**

*This question has not been answered yet.*

### **Now that you have thought hard about privacy and data protection, what improvements would you like to make? List them below.**

*This question has not been answered yet.*

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## Human values

How does the technology affect your human values?

*This category is only partial filled.*

### How is the identity of the (intended) users affected by the technology?

The technology creates new ways to interact through Leaderboards and classroom competitions. It empowers students by visualizing them as a "Hero" rather than a "struggling student." It shifts students from passive consumers to active "players" of their own education. There is a risk that students at the bottom of the leaderboard might feel stigmatized or demotivated.

### How does the technology influence the users' autonomy?

*This question has not been answered yet.*

### What is the effect of the technology on the health and/or well-being of users?

*This question has not been answered yet.*

### Now that you have thought hard about the impact of your technology on human values, what improvements would you like to make to the technology? List them below.

*This question has not been answered yet.*

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## Stakeholders

Have you considered all stakeholders?

*This category is only partial filled.*

**Who are the main users/targetgroups/stakeholders for this technology? Think about the intended context by answering these questions.**

**Name of the stakeholder**

Students at Erasmushogeschool Brussel (Programming Essentials 1)

**How is this stakeholder affected?**

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**Did you consult the stakeholder?**

No

**Are you going to take this stakeholder into account?**

No

**Name of the stakeholder**

Teachers

**How is this stakeholder affected?**

-

**Did you consult the stakeholder?**

No

**Are you going to take this stakeholder into account?**

No

**Did you consider all stakeholders, even the ones that might not be a user or target group, but still might be of interest?**

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**Now that you have thought hard about all stakeholders, what improvements would you like to make? List them below.**

*This question has not been answered yet.*

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## Data

Is data in your technology properly used?

*This category is only partial filled.*

**Are you familiar with the fundamental shortcomings and pitfalls of data and do you take this sufficiently into account in the technology?**

XP values for tasks are subjectively determined by teachers via the ConfigApi. Data on task completion does not tell the whole story of a students actual understanding. A high level in HabitHero does not automatically make someone a good programmer; the system must maintain this distinction.

**How does the technology organize continuous improvement when it comes to the use of data?**

*This question has not been answered yet.*

**How will the technology keep the insights that it identifies with data sustainable over time?**

*This question has not been answered yet.*

**In what way do you consider the fact that data is collected from the users?**

*This question has not been answered yet.*

**Now that you have thought hard about the impact of data on this technology, what improvements would you like to make? List them below.**

*This question has not been answered yet.*

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## Inclusivity

Is your technology fair for everyone?

*This category is only partial filled.*

### Will everyone have access to the technology?

*This question has not been answered yet.*

### Does this technology have a built-in bias?

The RPG style (combat, monsters) may subconsciously appeal more to male-identifying students. We use diverse avatars and a neutral interface (Tailwind) to appeal to the widest possible student group.

### Does this technology make automatic decisions and how do you account for them?

*This question has not been answered yet.*

### Is everyone benefitting from the technology or only a a small group?

#### Do you see this as a problem? Why/why not?

*This question has not been answered yet.*

### Does the team that creates the technology represent the diversity of our society?

*This question has not been answered yet.*

### Now that you have thought hard about the inclusivity of the technology, what improvements would you like to make? List them below.

*This question has not been answered yet.*



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## Transparency

Are you transparent about how your technology works?

*This category is only partial filled.*

### **Is it explained to the users/stakeholders how the technology works and how the business model works?**

How XP, Loot, and Combat work is clearly explained in the "Getting Started" section of the app. As an educational project, the model is non-profit. This is communicated to gain trust regarding data usage.

### **If the technology makes an (algorithmic) decision, is it explained to the users/stakeholders how the decision was reached?**

*This question has not been answered yet.*

### **Is it possible to file a complaint or ask questions/get answers about this technology?**

*This question has not been answered yet.*

### **Is the technology (company) clear about possible negative consequences or shortcomings of the technology?**

*This question has not been answered yet.*

### **Now that you have thought hard about the transparency of this technology, what improvements would you like to make? List them below.**

*This question has not been answered yet.*

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## Sustainability

Is your technology environmentally sustainable?

*This category is only partial filled.*

### **In what way is the direct and indirect energy use of this technology taken into account?**

The use of Serverless Firebase Cloud Functions ensures that servers only consume energy during active requests rather than running 24/7. The React frontend is lightweight and optimized via Vite, minimizing energy consumption on the student's device.

### **Do you think alternative materials could have been considered in the technology?**

*This question has not been answered yet.*

### **Do you think the lifespan of the technology is realistic?**

*This question has not been answered yet.*

### **What is the hidden impact of the technology in the whole chain?**

*This question has not been answered yet.*

### **Now that you have thought hard about the sustainability of this technology, what improvements would you like to make? List them below.**

*This question has not been answered yet.*

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## Future

Did you consider future impact?

*This category is only partial filled.*

### **What could possibly happen with this technology in the future?**

If used globally, the norm for education could shift from "having to learn" to "wanting to learn." An excessive focus on the "game" might overshadow the intrinsic motivation to learn (the extrinsic motivation trap).

### **Sketch a or some future scenario (s) (20-50 years up front) regarding the technology with the help of storytelling. Start with at least one utopian scenario.**

*This question has not been answered yet.*

### **Sketch a or some future scenario (s) (20-50 years up front) regarding the technology with the help of storytelling. Start with at least one dystopian scenario.**

*This question has not been answered yet.*

### **Would you like to live in one of this scenario's? Why? Why not?**

*This question has not been answered yet.*

### **What happens if the technology (which you have thought of as ethically well-considered) is bought or taken over by another party?**

*This question has not been answered yet.*

### **Impact Improvement: Now that you have thought hard about the future impact of the technology, what improvements would you like to make? List them below.**

*This question has not been answered yet.*