



FabLearn Europe / MakeEd 2021

Frustration as an Opportunity for Learning: *Review of Literature*

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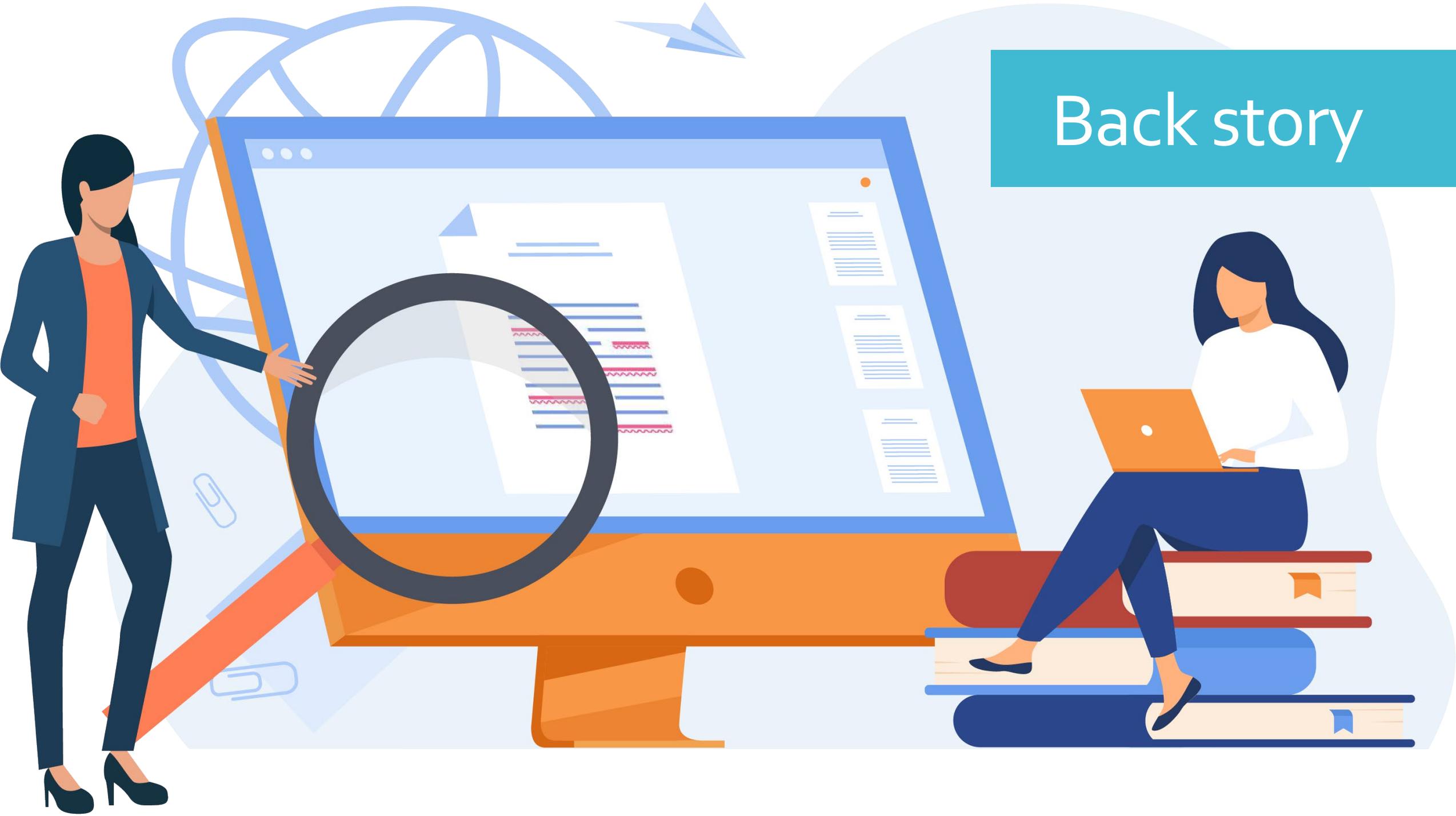
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FACULTY OF
EDUCATION

Back story



“... expressed **frustration** when people offer advice or make comments on their work at a stage in the project where they do not want it. ”

Sheridan et al., 2014

“... sometimes, apart from fun and excitement, **frustration** and boredom may arise due to usability problems. ”

Chu et al., 2015

“... the students expressed criticism, **frustration** and/or dissatisfaction toward the instructions given by their teacher... ”

Kajamaa & Kumpulainen, 2019

“... contributed to the students’ procedural activity—and in this case as well, **frustration**... ”

Kumpulainen et al., 2020

“Experiences with failure sometimes invoked negative emotional responses (20%) – **frustration** and disappointment being the most commonly reported. ”

Maltese et al., 2018

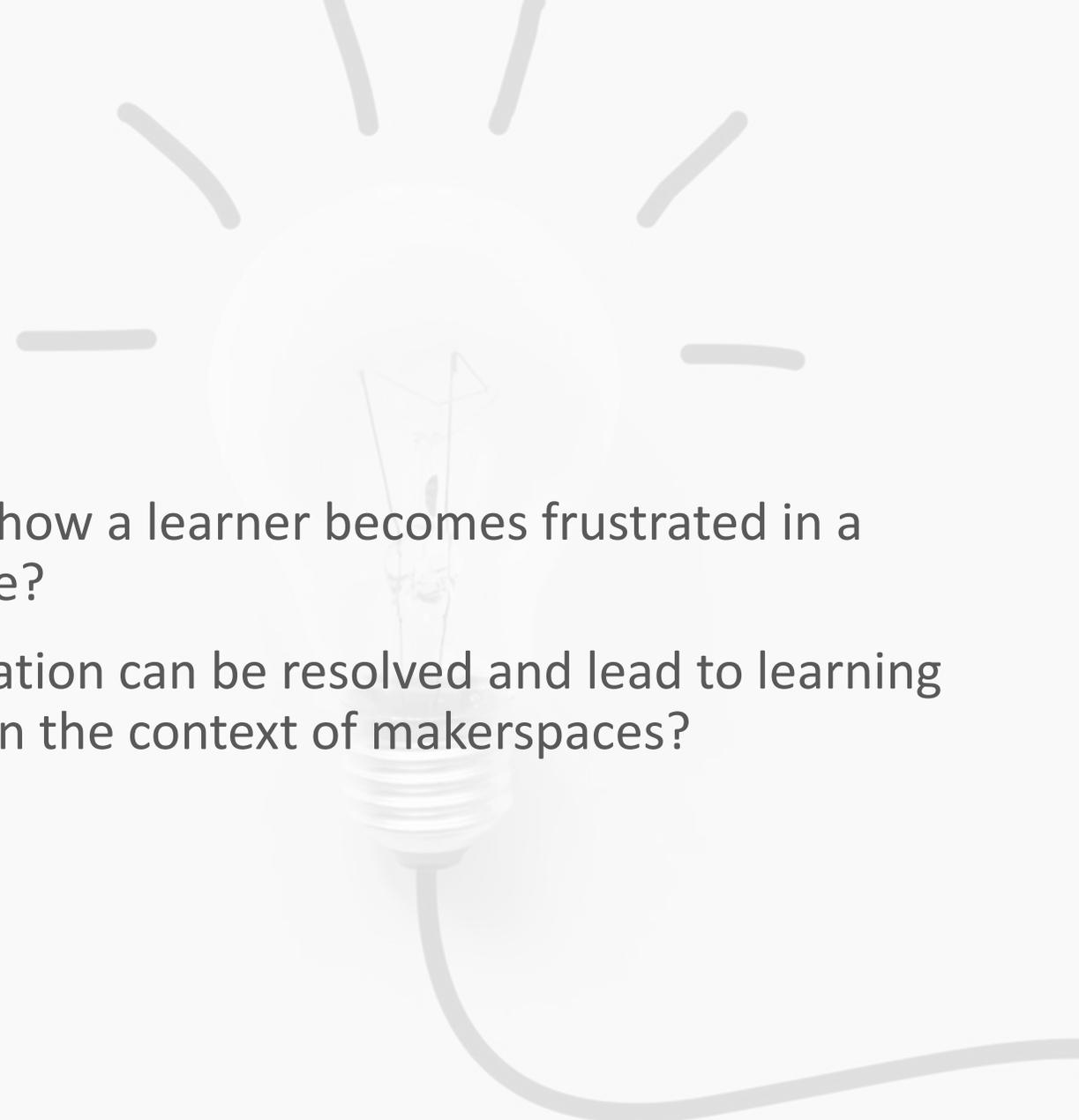
“... self-efficacy, as well as experiences of excitement and **frustration** with project tasks were found to be associated with students’ situational interest. ”

Vongkulluksn et al., 2018

“Ethan expressed great **frustration**. Two other students came to try to assist. ”

Fields et al., 2019

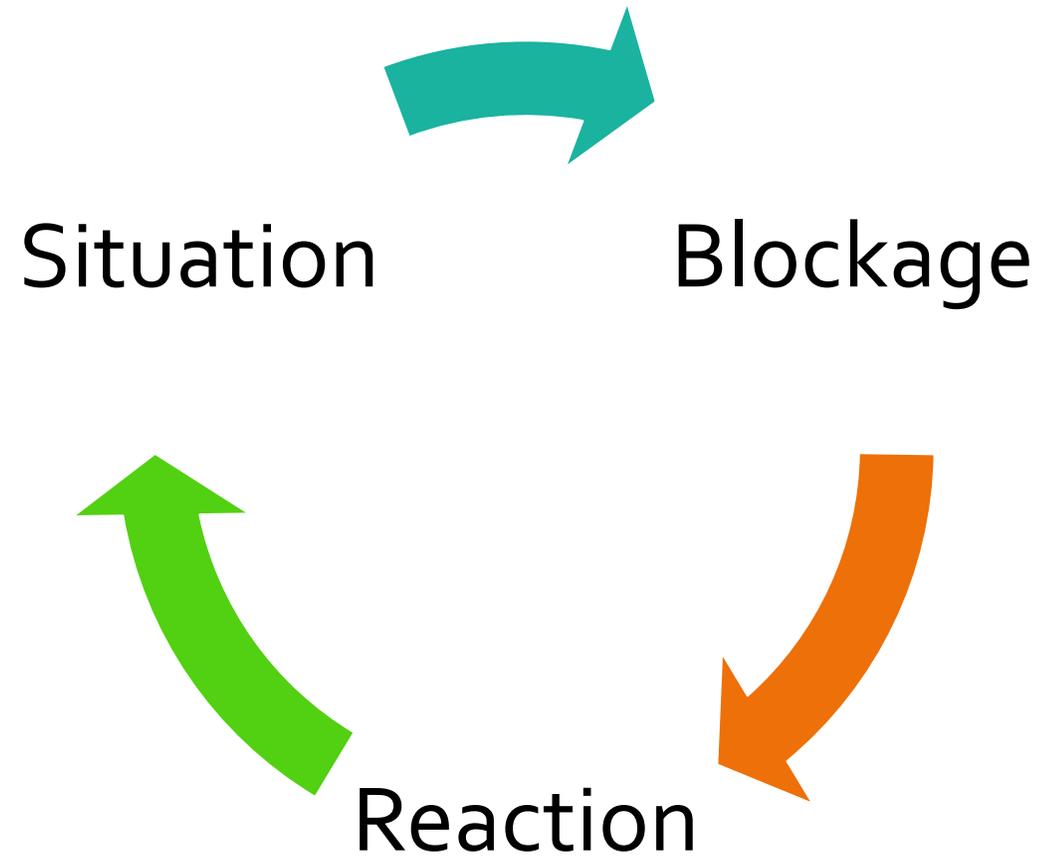
QUESTIONS

1. When and how a learner becomes frustrated in a makerspace?
 2. How frustration can be resolved and lead to learning outcomes in the context of makerspaces?
- 

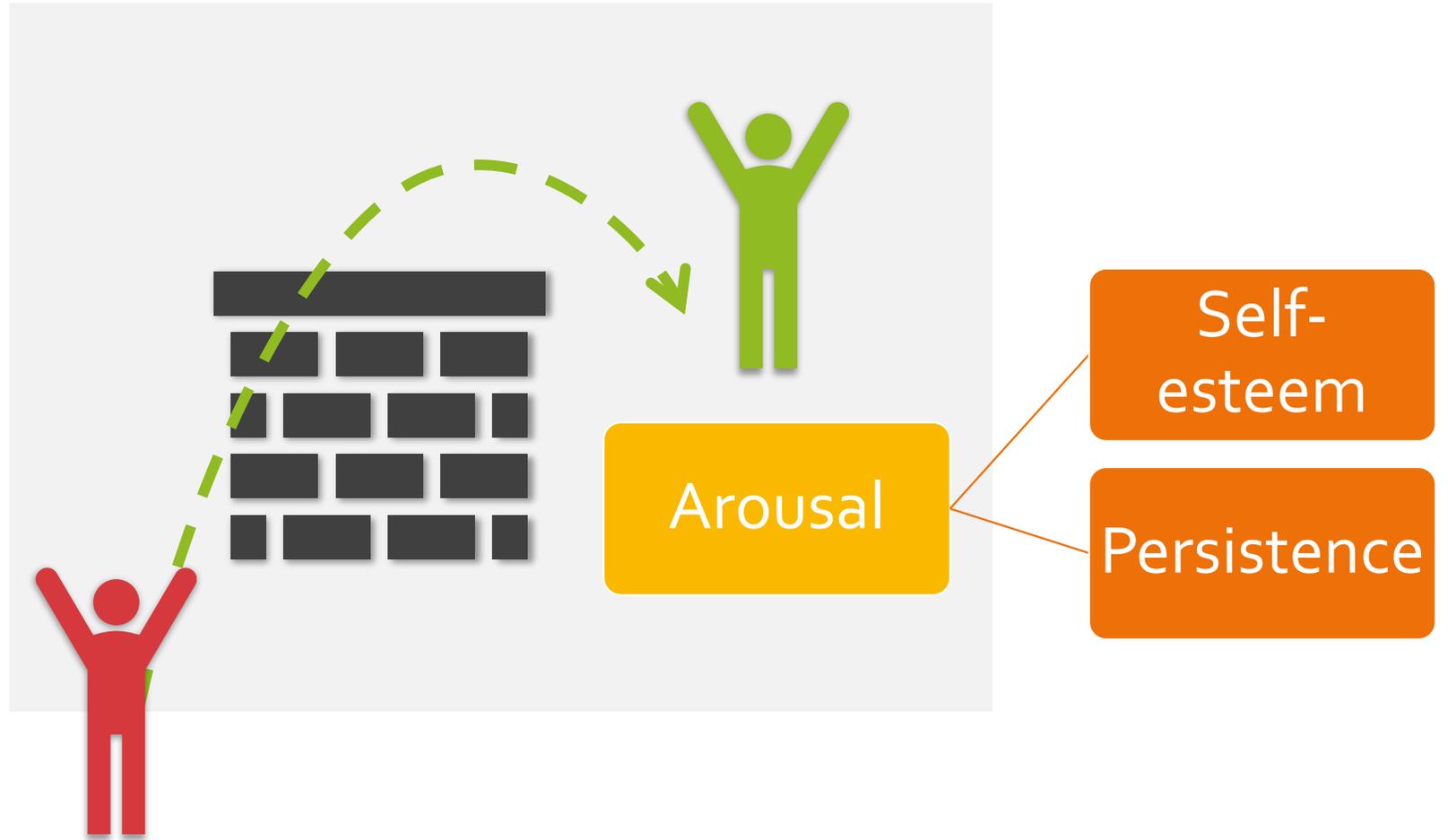
What is Frustration?

Frustration occurs when an individual is **blocked** from completing a **challenge** and reaching a **goal**.

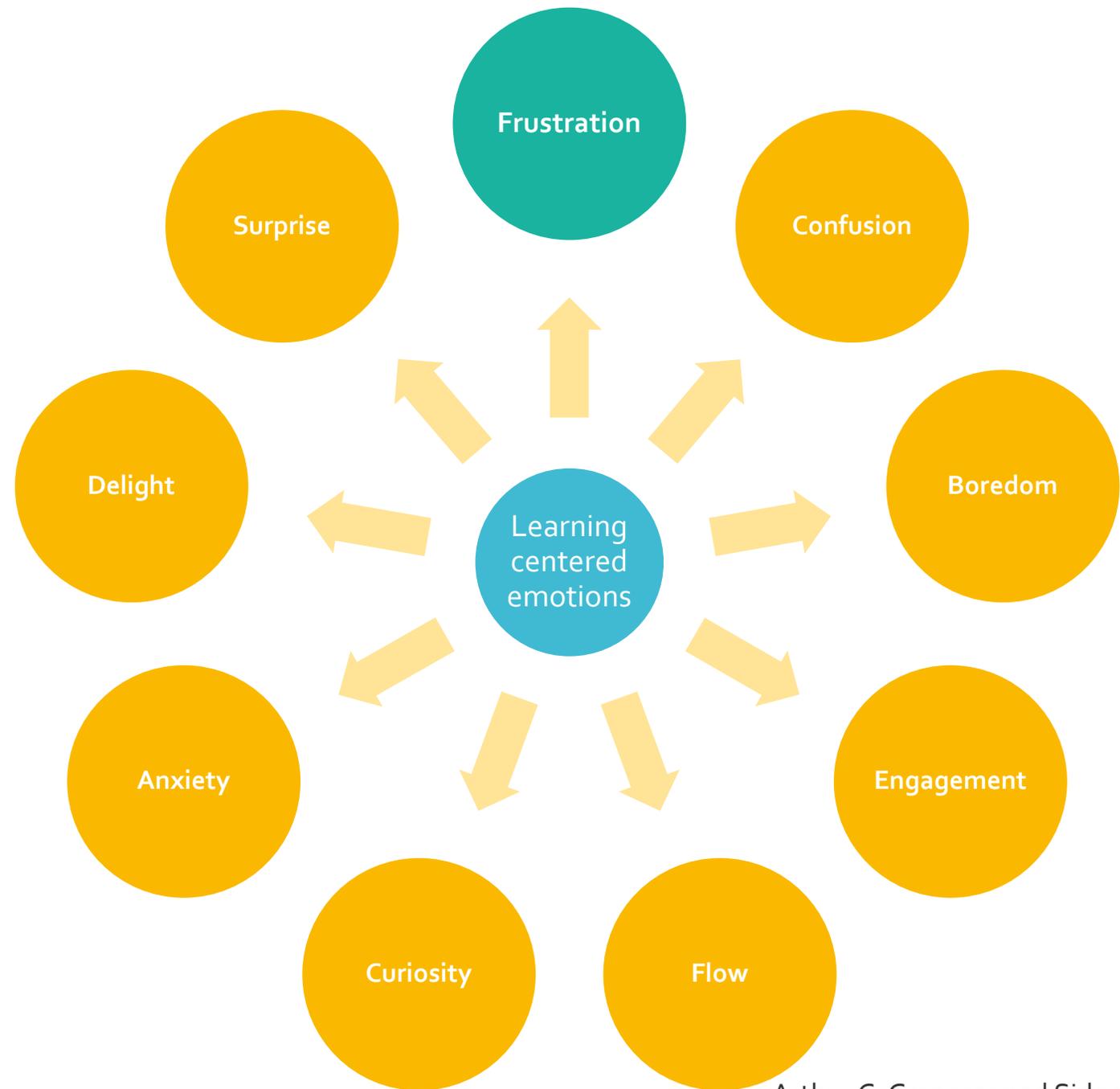
What is Frustration?



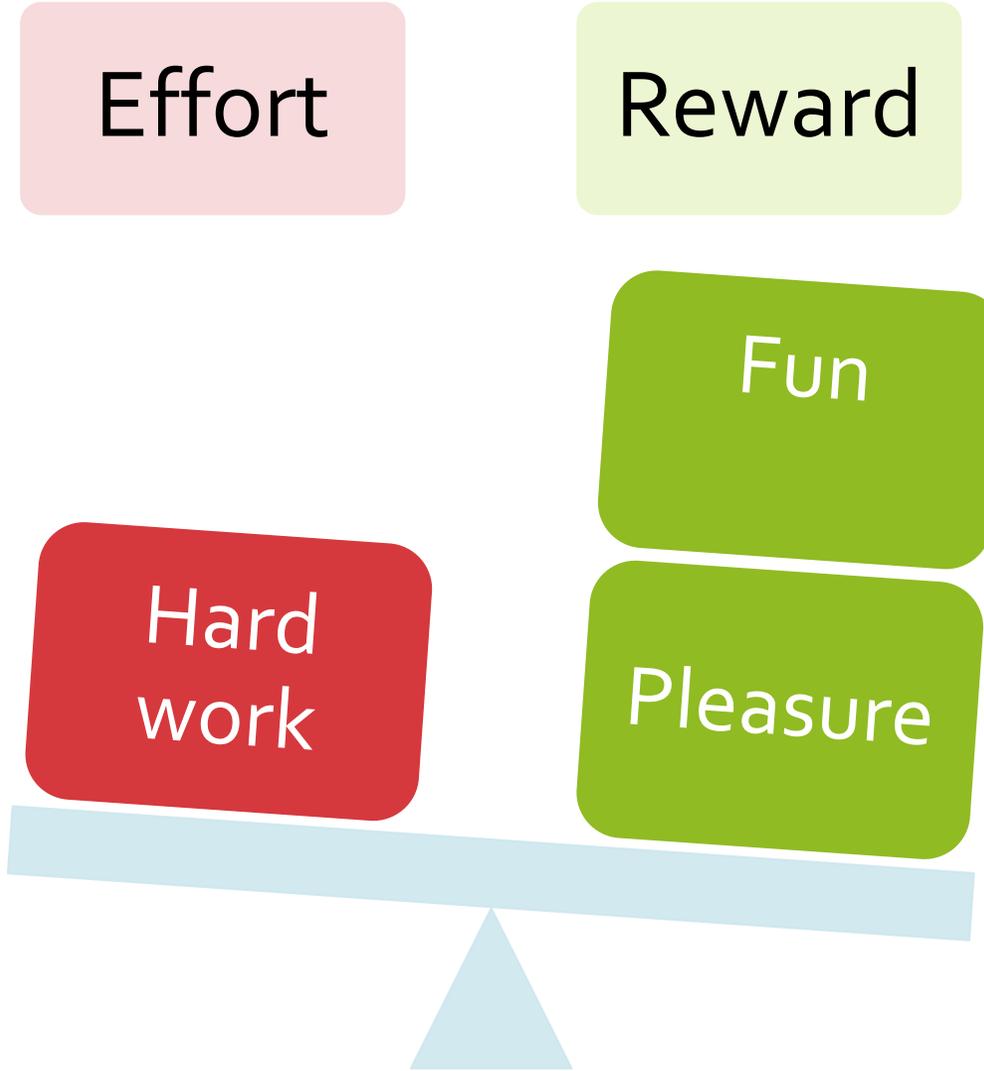
What is Frustration?



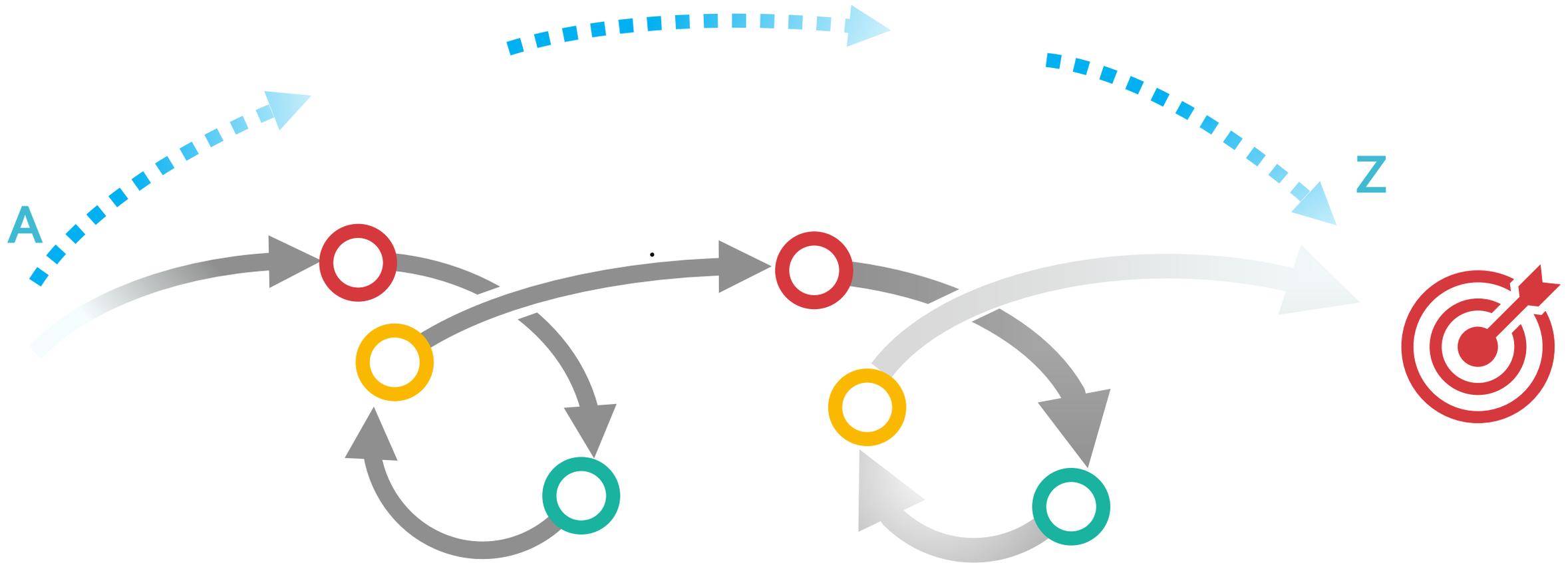
And how can it
be used for
learning?



And how can it
be used for
learning?



And how can it be used for learning?



Maker activity

Literature Review Methodology



Selection of papers

Phase 1: databases

[(self assessment or self evaluation or self reflection)
AND classroom AND maker]

Phase 2: databases + Google Scholar

[frustration + makerspaces]

EBSCOhost
Academic Search Premier
APA PsycInfo
Education Source
ERIC

Inclusion: Empirical studies. K-12 students getting frustrated during/with maker activities

Exclusion: Lit reviews. Teachers or researcher's frustration.



Thematic analysis

Selected papers

Author	Year	Makerspace program	Participants
Bevan, Gutwill, Petrich, and Wilkinson	2015	Museum-based program	Broad age-range learners
Blikstein	2013	School-based program	Broad age-range students
Blikstein, Kabayadondo, Martin, and Fields	2017	School-based program	Grade 4-12 students
Calabrese Barton, Tan, Greenberg	2016	Afterschool program	Grade 7-9 students
Chou	2018	School-based program	Grade 5 students
Chu, Quek, Bhangaonkar, Boettcher, Sridharamurthy	2015	School-based program	Grade 2-6 students
Fields, Lui, and Kafai	2019	School-based program	Grade 10-12 students
Harron & Hughes	2018	School-based program	K-12 maker educators
Kajamaa & Kumpulainen	2019	School-based program	Grade 5 students
Kumpulainen, Burke, Yaman, and Burcu	2020	School-based program	Grade 3-6 students
Maltese, Simpson, and Anderson	2018	School-based program	K-12 maker educators
Sheridan, Halverson, Litts, Brahms, Jacobs-Priebe, and Owens	2014	Community-based program	Broad age-range learners
Vongkulluksn, Matewos, Sinatra, and Marsh	2018	School-based program	Grade 3 & 6 students

RESULTS

When and how does a learner get frustrated in a makerspace?



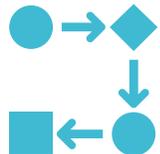
Open-endedness



Time constraints



Collaboration



Iteration



Lack of skills/knowledge



Outcome expectation



Unfamiliar pedagogical approach

RESULTS

How can frustration be resolved and lead to learning outcomes in the context of makerspaces?



**Better
communication with
educators**



**Norm setting for
accepting failure,
troubleshooting, and
iteration**



**Personal
commitment**



Confidence and skills

FINDINGS

- We could not find any papers whose main theme was frustration in makerspaces.
- In the revised studies, authors observed frustration but did not mention its importance for the success of the activity.
- The nature of makerspaces presents several situations that trigger frustration (e.g., student-centered, iterative, etc.).
- Educators can overlook frustration if they believe students don't need guidance in a makerspace.
- Educators must play an active role and assist students in overcoming frustration.

Practical Suggestions

At the beginning

- Break it down
- Scaffolding
- Orientation
- Collaboration

At the end

- Activity selection
- Be flexible
- Achievable goals
- Make it personal
- Set expectations
- Confidence

During the activity

- Focus on process
- Document and reflect



Humphrey, J. (May 13, 2016). Messy makerspace [Twitter post]. Retrieved from <https://twitter.com/jhumphreyBV/status/731151787009265665/photo/1>

Conclusion

Based on the revised literature we

- Highlighted factors that can lead to frustration in makerspaces and how it can be resolved
- Proposed strategies to help facilitators and support students
- Showed frustration as a critical turning point in the learning process

Limitations and future work

Limitations

- Relied on academic databases
- Limited the search to the term frustration
- Did not consider developmental differences in participants

Future work

- Integrate other valid sources
- Use broad synonyms for frustration
- Compare and examine how different age groups might experience frustration.



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More information

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