Focus Group Results

- ▼ What is the problem we're trying to solve?
  - helping in focusing
  - optimizing time usage
  - getting an overview about everything important (übersichtlicher)
  - enjoying the process of learning
  - helping in learning better and more effective
  - getting better grades/ passing the course
  - staying motivated
- ▼ How is it solved so far (without the dashboard)?
  - notion/note-taking
  - calender
- ▼ Pain points of distance students/ professors
  - less connections to other people; little exchange with other people (lack of motivation, struggle with course content, etc.)
  - no ways of clarifying doubts collaboratively
  - can't discuss difficulty of course (to relieve stress)
  - can't share tips, resources with each other
  - no networking and making stronger bonds easily
  - less time; cannot often not study as regularly
  - have a lot of other things on mind
  - might have very different learning goals
- ▼ Objective of dashboard
  - Self-monitoring for learners
  - Timetracking (where did I spend the most time, no time)

- - Time spent on each section
    - Ability to enter the time spent offline on the course
  - Learning resource use and recommendations
  - Course overview
  - Detect if student is doing very well / is at risk
  - Find new insights
  - Show if weekly assignment is handed in already

Forethought phase

▼ (Intrinsic) Motivation

- "when you finish topic X, you can now build Y"
  - needs to work very well; helps to find practical use cases to consolidate your knowledge
    - show next to a topic: Once you learned this topic, you can do this → very big motivation (visual result, probably very effective in programming courses)
- Why are you learning this topic? → write motivational statement for oneself to help with intrinsic motivation
  - if at all optional (might be annoying over time)

▼ Goal setting

▼ questionnaire to ask about learning goals ✅

- Possible learning goals:
  - pass course
    - time spending relative to just passing
    - ressources to useful things
  - pass course very well
    - How are my marks so far
    - compared to average of students
    - example exercises

- - - prediction of final grade

        - time spending needed for good grade

    - Unlock job opportunities / needed for new job /promotion

        - example interview questions

        - example job profiles

        - how is this knowledge used in the job

        - get in contact with aluminas (linkedin, email)

    - own personal interest

        - for building a cool project

            - Links to external sources → How did people use this knowledge to earn money?

            - Person wants to know what to do with it → What can I do with it? Example projects

        - start own business

            - Links to external sources → How did people use this knowledge to earn money?

        - interested in the topic

            - Person wants to know what to do with it → What can I do with it? Example projects

        - get introduction to topic

- ▼ How much time do you plan to spend on the course in total/ each week?

- ▼ questionnaire about learning characteristics / learning strategies?

- ▼ adapt to different goals → adjust thresholds; prompts

▼ Strategic planning

▼ visual representation of average time required to do certain parts of the course ✅

- show average time required by peers to finish the course (or maybe recommended time by course instructor) → based on similar students from earlier semesters (students with same learning goal)

- - suggestion of how much time to spent
  - show which topics where not covered yet
  - Roadmap
    - timetable / calendar
    - displaying deadlines
  - Progress bar
- ▼ To-Do list

Performance phase:

- links to important topics (connecting knowledge and topics)
- add pomodoro timer to dashboard
- ▼ (Attention) Focusing
  - Notes taking
    - "look into" (not priority but interesting to look at)
  - reminder to study/ look at certain things again
  - show newest activities (forum posts; new content uploaded)
- ▼ Learning Strategies
  - Network map of connected topics
  - mind-map
  - reinforce learning
  - analogies
  - spaced repitition
  - storing notes in form of questions
  - Give hints to self-regulated learning
  - → adapt to different learning concepts

- ▼ Connecting to other people

- mark what you understand well / not well → ask for help / offer help to other students (encouragind people to interact → networking, teaching others, …)

▼ Self-observation

- possibility to add how much time spent on each topic offline

- show amount of content coverage

- how much time spent where

- Visualize results of Einsendeaufgaben compared to time spent on them (or resources used)

- maybe consider at what time they learned (Does the time (morning, evening) correlate with results?)

- maybe asked students for mood (→ do they learn better, if their mood is better?)

▼ Learning Content

- Upload additional material for each section

Self-reflection phase:

▼ Feedback/ Self-reflection

- giving feedback about your learning style

- mark what you understand well / not well (rating 1 to 5)

- Maybe being able to mark those weeks that I want to look at again, or those weeks that I understood well or seemed easy

- rate own understanding of topic

- quiz/ assignment results that highlight strong/weak points in the syllabus and directs to specific paragraphs

- visualize assignment results

- predict if student will pass/fail (Bzw. reach their specific learning goal)

- show them when they last interacted with the content (→ help them to remember to revise knowledge)

- show them what they did not do so well

- maybe remind them to do the things they were not that good at, to do more often

- show grades compared to others (or maybe show also time spent compared to others, but that might be demotivating)

- indicators based on social interaction

- access graph (shows for each activity how often it was accessed)

- hits distribution (line chart that visualizes the activity over the past weeks)

- time sequence of events

- heatmap to show user interaction

- maybe comparison of how much time already spend on the course in comparison to how much time they are supposed to spend on the course

- add field to add "self-reflective notes"

- Möglichkeit der Selbsteinschätzung: Für ein Thema/LE anhand einer 5-Sterne Skala angeben, wie gut man das Thema verstanden hat (→ Möglichkeit sich selbst Feedback zu geben)

→ Mischung aus implizitem und explizitem Feedback (implizit: z.B. Dauer in der man sich mit einem Thema beschäftigt hat; explizit: Selbsteinschätzung)

- weekly activity graph

Allgemein:

▼ Adaptive

- maybe the dashboard can adjust depending on which phase in the self-regulated learning cycle someone is in?

- Consider personal characteristics such as prior knowledge, professional experience, learning goals and learning progress

  - Requires to select approbriate learning resources/ visualizations

  - Provide a pool of resources such as slides, course texts, tests, videos, book chapters with associated metadata

- adapt the dashboard graphics/ things that are displayed according to the learning process

- Adapt to specific learner goals

- using data about the user's preferences and behavior to adapt the layout and content of the dashboard

- using data about the user's preferences and behavior to adapt the layout and content of the dashboard in a way that is tailored to the user's needs.

- adjusts the layout and content based on the student's progress in a course. The dashboard might show different widgets or layout options depending on the student's performance, the difficulty of the material, or the student's engagement with the course.

▼ Personalized elements

- order widgets to own liking

- add filters for time range/ topics

- define own metrics (which metrics?)

- Allowing learners to select the data they want to monitor from a flexible and extendible set of indicators would support learners in developing their metacognitive skills further and encourage them to take a more active role in LA, in line with the solution proposed by Durall et al. [50]. (Jivet thesis)

- customizable interface for creating a personalized dashboard

- provide a flexible and customizable interface for creating a personalized dashboard

- provide personalized feedback and recommendations

▼ Personalized + adaptive

- For example, you might provide a set of widgets that the user can choose from and arrange on the dashboard, and then use data about the user's previous interactions with the widgets to suggest additional widgets or layout options.

- provide a set of pre-defined dashboard templates that the user can choose from, and then use data about the user's preferences and behavior to customize the content and layout of the template.

- use machine learning algorithms to analyze the user's data and suggest personalized dashboard layouts and content based on the user's past interactions and preferences.

- In general: the adaptive personalized dashboard would use data about the user's preferences and behavior to adapt the layout and content of the dashboard in a way that is tailored to the user's needs and goals.

- shows the student's progress in a course, including the grades for completed assignments, the percentage of the course that has been completed, and the time spent on the course. The dashboard might also show personalized recommendations for additional course materials or resources based on the student's progress and interests.

- shows the student's performance on different types of assessments (e.g. quizzes, exams, projects) and provides feedback on areas where the student is doing well and areas where there is room for improvement. The dashboard might also show personalized recommendations for additional study materials or resources based on the student's performance.

- shows the student's participation in online discussions and other collaborative activities, and provides feedback on the student's contributions and engagement with the course material. The dashboard might also show personalized recommendations for additional collaborative activities or resources based on the student's participation and interests.

- shows the student's performance on different skills or competencies, and provides feedback on the student's strengths and areas for improvement. The dashboard might also show personalized recommendations for additional learning resources or activities based on the student's performance and goals.

- help page with information and faq

- dialog that opens to ask for user consent on data use (and on willingness to connect to other students)

- interactive tour/introduction to get to know the functionalities of the dashboard

- add icons and symbols to support text whenever possible to support user experience

- general course information (like credits, exam date, course requites, upcoming events)

- actionable insights → give learners additional information how to act on the information; give information which data is used, etc.

- Im Idealfall ist alles in einem einzigen Display zu sehen. Ohne mehrrer Tabs etc. Ziel des Dashboards ist es einen schnellen Überblick zugeben.

- make it clear why dashboard use is beneficial to students

▼ Adaptive visualizations:

  - filter the visualizations to specific periods

  - add different kind of filters

  - Filter: Alle Kurseinheiten oder nur eine bestimmte Kurseinheit bzw. mehrere Kurseinheiten visualisieren

  - many visualizations feature different views
    options allowing to change the form of presentation. Often, the data can be filtered for specific courses.

  - Building on these findings, the metrics displayed on the widget, the framing of the feedback, and the visualisation chosen can be customized to the learners' skill, knowledge and cultural background. (Jivet master thesis)

▼ Interactive elements:

  - click on elements to show detailed view

General:

- Visualize results of Einsendeaufgaben compared to time spent on them (or resources used)

- maybe consider at what time they learned (Does the time (morning, evening) correlate with results?)

- maybe asked students for mood ($\rightarrow$ do they learn better, if their modd is better?)

- show them when they last interacted with the content ($\rightarrow$ help them to remeber to revise knowleldge)

- show them what they did not do so well

- maybe reming them to do the things they were not that good at, to do more often

- show grades compared to others (or maybe show also time spent compared to others, but that might be demotivating)

- indicators based on social interaction

- comparison with others (yes/no?)

  - visualization of grade distribution in a box plot

  - quiz and assignment submissions (visualized the number of submissions for each quir or assignment)

- access graph (shows for each activity how often it was accessed)

- hits distribution (line chart that visualizes the activity over the past weeks)

- Learners can set their own goals and choose indicators grounded in learning theories they wish to monitor.

- Students can compare their achievements, participation levels, assessment scores etc. with other students

- Allow learners to generate indicators of their own choice

- dashboard can adapt to the srl phase the learner is currently involved in

- According to the literature, students can benefit from LA dashboards by allowing them to set personal goals, see progress toward their goals, obtain feedback about their learning, become motivated by receiving immediate feedback, and make decisions about what to do next (Bodily et al., 2018;Jivet et al., 2017;Schumacher & Ifenthaler, 2018;Sedrakyan et al., 2020)

- give additional ressources fitting to the job/ career I'm pursuing or I want to pursue