# Discussion

This section contains explained differences between results and design, limitation of the project and suggestions for further development.

## Design and results comparison

Overall, the design functioned as expected. Nevertheless, some features had to be abandoned, as their functionality was not required. Notably, the use of RX/TX or D0/D1 pins turned out to be complicated. Their behavior is different in comparison to standard digital pins, which was found out later in the project. Therefore, they are not used in the final version of the project. In addition, the button for additional feature, initially intended as a switch to turn on or off sleep mechanism, could have not been implemented due to a design flaw. It is described in section 3.4 Problems during assembly.

What’s more, it was decided that control panel potentiometer will not be used. It was intended as a tool to change brightness or color component directly on the control panel, however, such implementation proved to be more complex than the implementation of this function to the control panel buttons. Another neglected feature is the ability to change color components in HSV format, in Room 3 via the control panel. Presumably, the adjustment of the color values was faulty due to unknown cause likely stemming from coding errors. The displayed format of the color in Room 3 menu can still be changed, but the ability to adjust color values is solely available in RGB format.

## Technical limitations

Moreover, some of our decisions were not optimal due to a few restrictions. One of the restrictions were mandatory requirements of the project, namely the use of Arduino Nano microcontroller and LCD display provided by the SDU. However, these requirements weren’t and shouldn’t be considered as true restrictions within the context of the project. The aim of this remark is to acknowledge these requirements, as they fundamentally influenced the development process. In addition, other confinements were introduced by electrical component provider and PCB manufacturer. Choice of electrical components was restricted by the limited variety of component models sold by the provider, while the design of PCBs had to align with available services of PCB manufacturer.

### Retrospective

Furthermore, the dynamic of a newly-formed project group affected the whole development process. The project plan design was unrealistic, as the capabilities of the members didn’t match the task skill/knowledge requirements most of the time as well as the pace proposed by the plan was too high. However, due to the high frequency of group meetings, there was consistent work done each week and any problems could be resolved quicker. Arguably, a thorough plan was not required to efficiently finish the project due to a few factors. These include: Members were new to the concept of work in group on such technical project, members weren’t familiar with all the aspects of the development process, but most importantly, cumulative acquisition of knowledge didn’t allow smoother completion of tasks during the whole semester. Nevertheless, a group would benefit from more frequent assignment of deadlines to the tasks emerging during the meetings. Notably, this section is not objective and is written from writer’s perspective. The opinions of members on this topic might significantly differ.

### Conclusion

To conclude, couple of insignificant features included in the design weren’t implemented due to various reasons. Various sources of technical limitations were mentioned. The group dynamic is brought up as a factor influencing the development process, while the requirement of a strict project plan is challenged.