# 6TH HEP C++ COURSE

POST TRAINING DISCUSSION

STEFAN ROISER, 15 MARCH 2023
"ADVANCE THE HEP C++ COURSE" MEETING

# GENERAL STATS OF THE COURSE

▸ 100 places opened and booked, within ~ 3 weeks

    ▸ ~ 75 attendees at the course

    ▸ Better than last course (advanced course)

▸ Did the registration fee work?

    ▸ ~ 20 people did not pay but also did not attend

    ▸ –> almost everyone who payed also attended

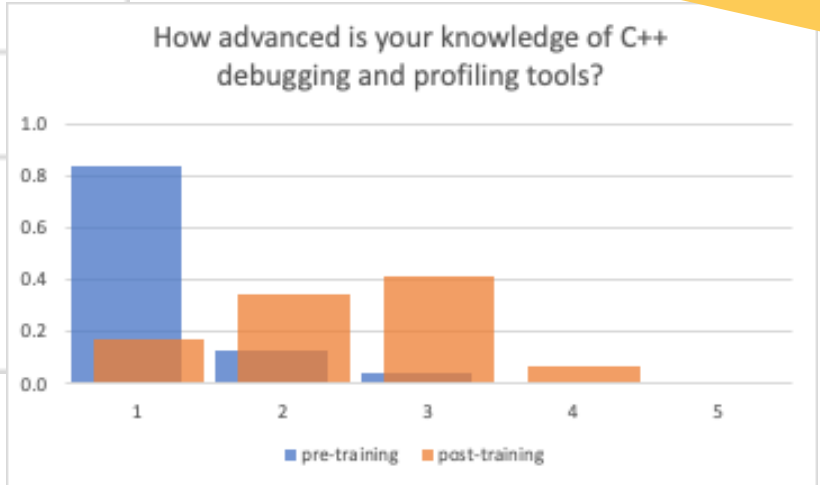   ▸ This gives us now an estimate on how many attendees we shall have

SELF PERCEPTION OF STUDENTS ON COURSE TOPICS PRE/POST TRAINING
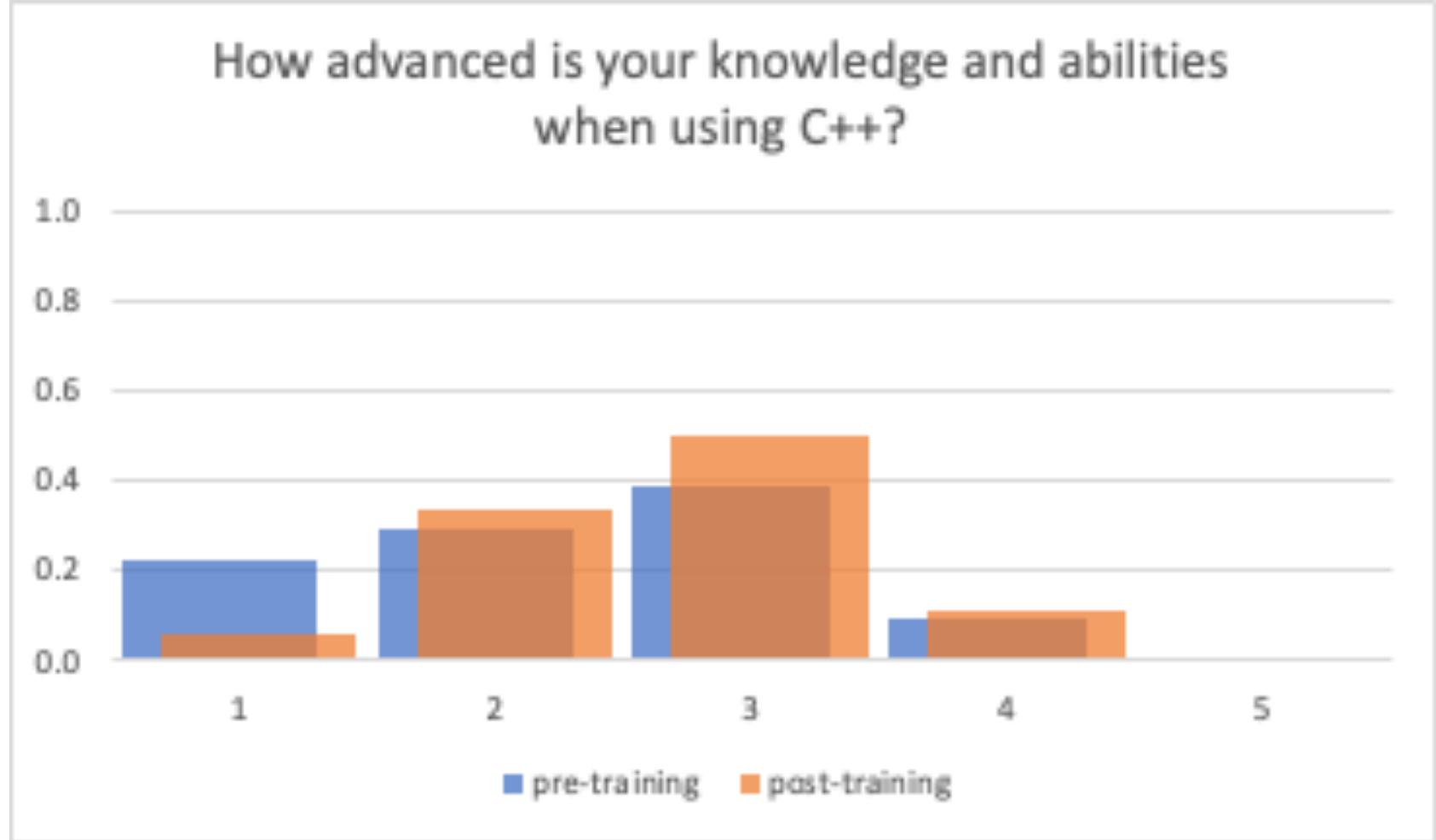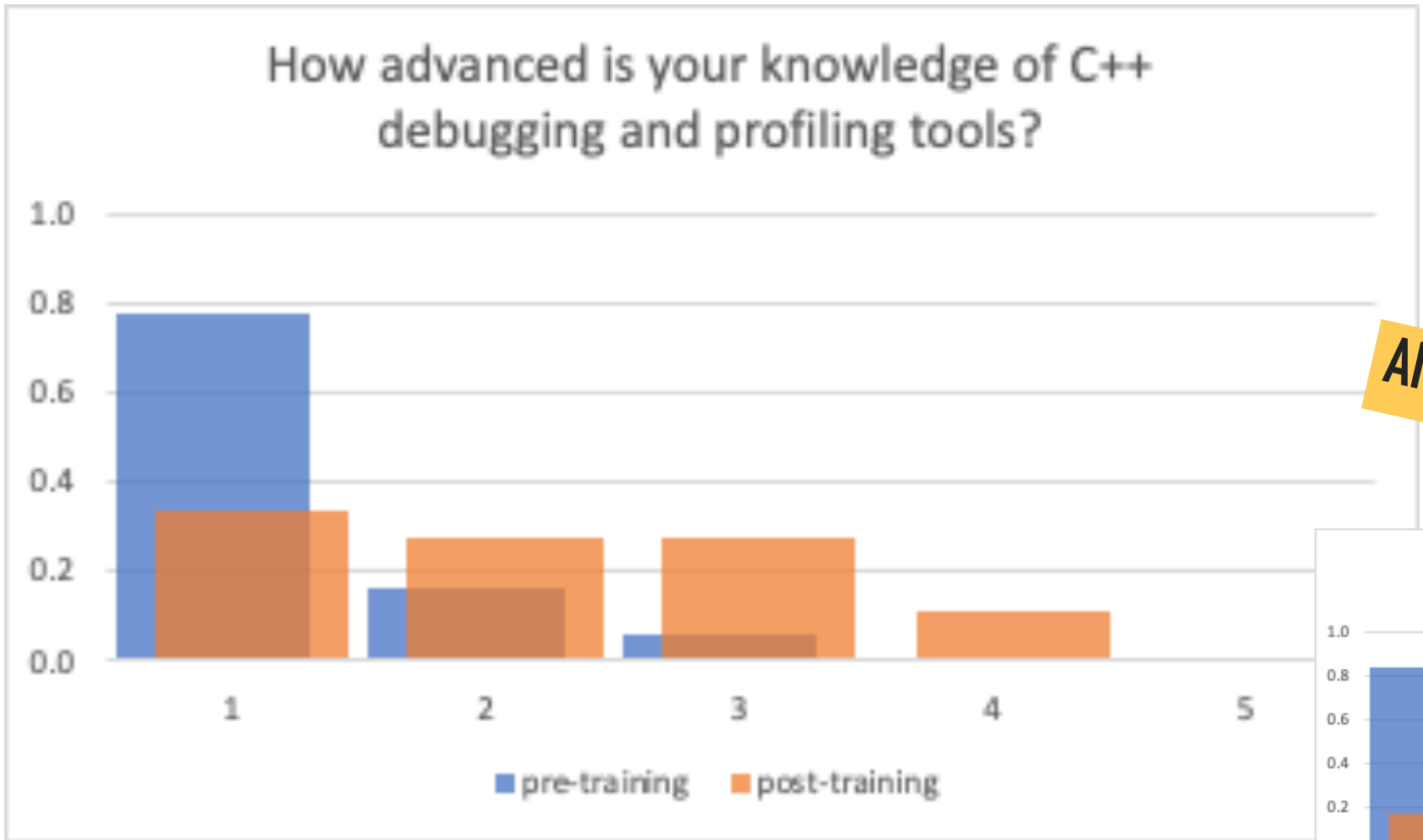
SATISFACTION WITH THE EVENT
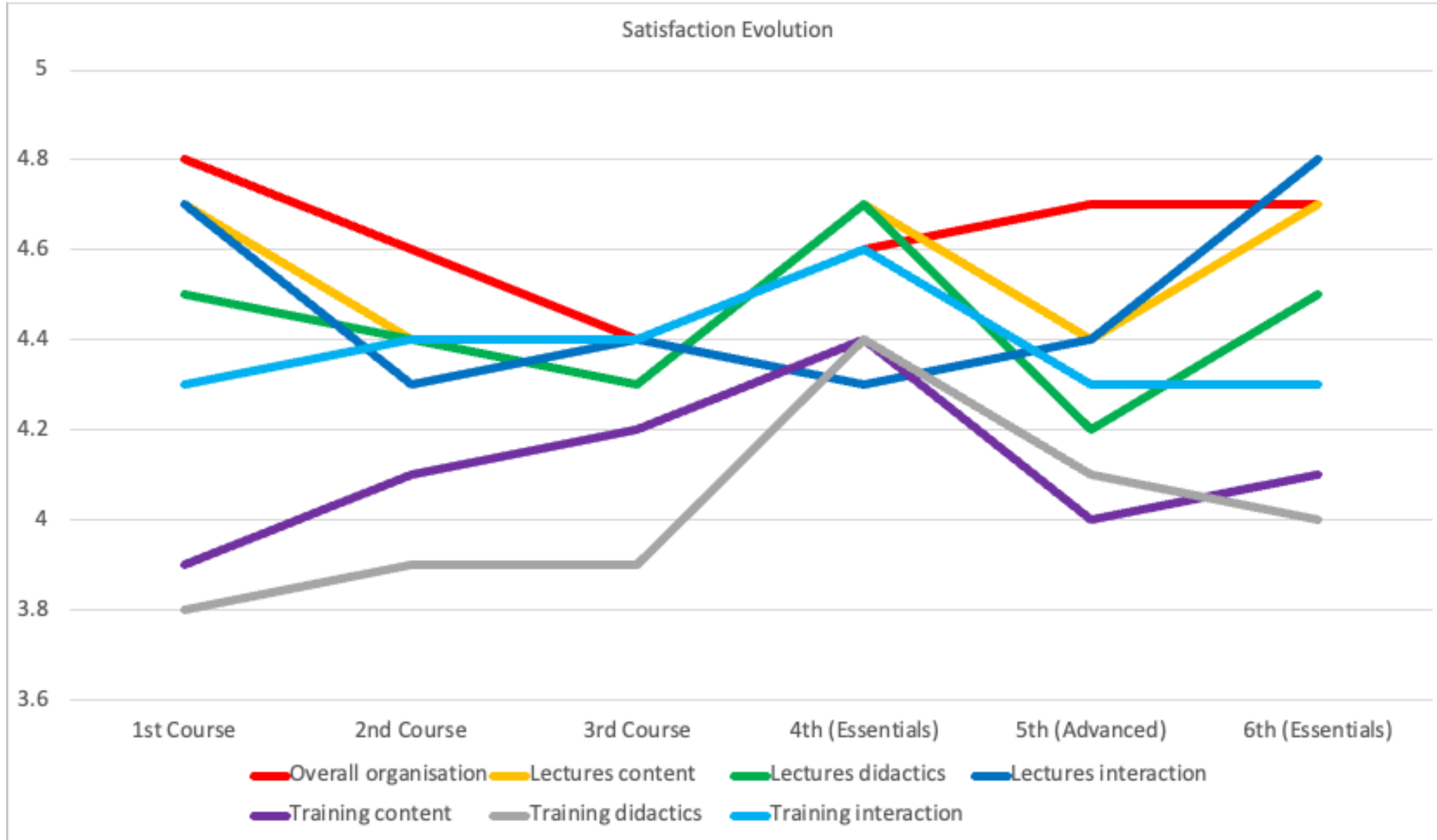
Not satisfied = 1,
Very satisfied = 5
(bigger is better)

Satisfaction Evolution

Please let us know which training format for such events would fit for you best
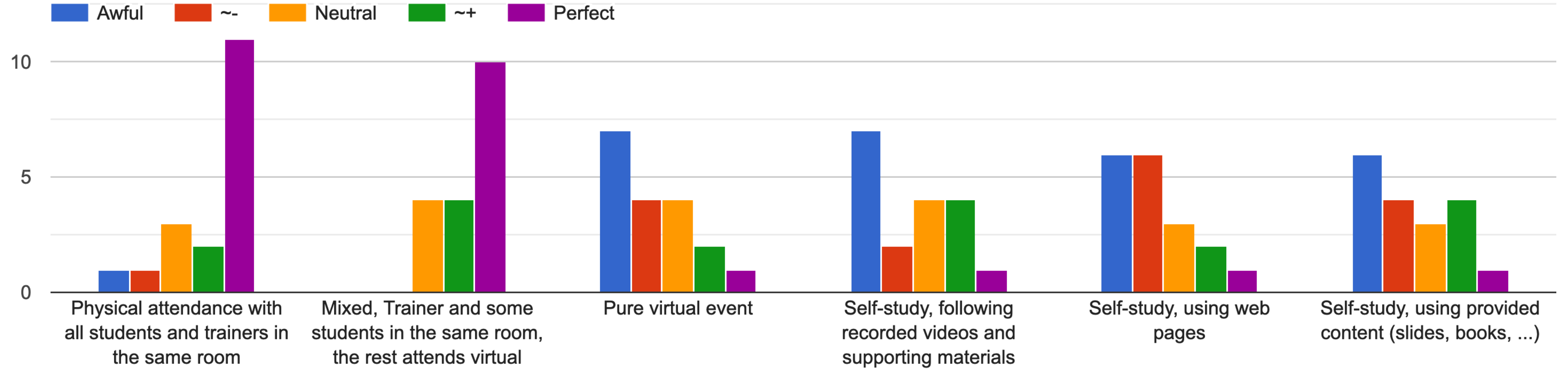
▶ All physical and hybrid most preferred

DISCUSSION POINTS?

▸ Do "pair mentoring" (see comment later)

▸ Next course. Open registration 6 weeks in advance with payment reminders, extend the number of places two weeks before the course to fill up 100 places

▸ Better explain how TID payment works, example screenshot

▸

POST TRAINING SURVEY (VERBATIM) TEXT ANSWERS

THIS WAS THE FIRST TIME WE RAN THE COURSE WITH "LEAP DAYS" IN ORDER TO ALLOW WORKING MORE ON THE EXERCISES. DO YOU HAVE ANY COMMENTS ON THIS?

▸ I **didn't need them** to wotk on the exercises but it was really **useful to better organize my workload** around the course

▸ This seemed a **perfect match** for the students to work on the exercises

▸ This **worked for me very well** because there was time to finish up and think a bit about the topics covered.

▸ I found the inclusion of leap days in this course to be **very helpful**. It allowed me to catch up on exercises that I wasn't able to complete previously due to time constraints. The **overall pace** of the course **felt less intense** and I was able to **collaborate** more easily **with colleagues** at CERN during the extra days.

▸ No, I think it **was great** and gave us more time to **"digest" the material**

▸ I think it made it more feasible to attend the lectures.

▸ It was **perfect**! Continue with the current schema!

▸ I **like it more than non-stop** course

▸ **Very good idea** as it provides time to **"digest" material** from the previous day.

▸ Great idea. On the leap days there was time to **go over some parts** of the lecture or exercises. Also, it helped me to **work on my usual stuff** and come back the next day for the next lecture and tutorial session. I think for me it helped my concentration and also motivation in some kind.

▸ It was good to have **extra time to work on the problems**. However, consider the complexity of C++, I think what is needed is mainly the chance to discuss and ask questions rather than a lot of extra time. Perhaps an **additional hands-on session on Thursday** would have been beneficial.

▸ It was good to **think a bit more on the topics** of the lectures, but I would have preferred a **three days course to do not commute from Lausanne in different days**

▸ I **don't think it was necessary** to have leap days, except for the last hands-on session the exercices were feasible during the dedicated time

▸ It was good

THE COURSE IS PROVIDED IN TWO PARTS, "THE ESSENTIALS" AND "ADVANCED C++". DO YOU HAVE ANY COMMENTS ON THIS PART OF THE COURSE?

▸ It was **clear and useful**, I will probably try to follow the Advanced course too

▸ It was an **excellence choice** at least for me.

▸ I believe it is nice that there is a division as **towards Friday** more things seemed "**too advanced** for me as of now", but it was nice to have the intro of Monday.

▸ I would have preferred to complete the **"Advanced C++" section more slowly**.

▸ I took part in "The Essentials" and I have no comments on the content of it. I **wouldn't move anything**

▸ No, I agree totally!

▸ It was **well suited** for beginners

▸ Some stuff felt like it was **more than "just the essentials"**, especially the **last day**. But this is maybe just me not having much experience with C++ and many concepts and powerful tools that one can use. For me, as a non expert but also not being total newbie to C++, this course had about the right depth and level of difficulty

▸ I think the **curriculum was a bit too dense** for an essentials level course. I see that many things needed to be introduced to explain other things, because of how interconnected the language is, but I **struggled with the Wednesday and Friday lectures** because of the amount of different, new things presented.

▸ I think that for an essentials course it was **quite dense**, but very clear and the training sessions were very useful to understand better what discussed in the lectures. I think that it's a course for people who have already used a bit of C++ in their career, and should be convenient to **explicitly say that in the subscription form**. For me, it was ok, but I guess that there were students really struggling since real beginners.

▸ No

AT THE SAME TIME WE RAN THE COURSE IN "HYBRID" FORMAT (PHYSICAL ROOM + ZOOM). DO YOU HAVE ANY COMMENTS ON THIS FORMAT?

▸ I attend in **virtual** form, it was **great** since the audio sound was perfect, also they were ready for the people in zoom to answer us.

▸ I attended **in person**, so it **worked** for me.

▸ In my opinion, the **hybrid format worked well**.

▸ I **enjoyed this format** a lot

▸ That's a great way to **be** more **inclusive**.

▸ Nope, it was convenient!

▸ It is really **appreciated**

▸ It was **great** to have the **hybrid format**, because thanks to it I was able to participate, because I live in **Brazil**

▸ I attended **in person** and for me it **was great** to do so. However, I think it is a very good idea to give (even) more people the chance to attend this course, who are for whatever reason, not at CERN. The Zoom sessions worked really well and the **questions from Zoom were also good hearable** in the room. So overall, the **Hybrid** format **worked well**.

▸ No it is good

IS THERE ANYTHING ELSE YOU WOULD HAVE LIKED TO LEARN ABOUT?

▸ So far the **expertise from the organizers surpasses my experience** so great.

▸ I probably **would learn anything from you guys** if it was delivered in a similar fashion!

▸ Maybe a bit more about the c**ode writing environment** - which one is best to choose, how to quickly execute editing commands etc.

▸ Go deeper in **containers, tools, good practices**. Templates are less used than containers

▸ I would like to learn about some high energy physics simulator that uses C++ as language (Like **geant4**, for example). I use it at my university and there are always new things to learn, as it is a program with a high diversity

▸ **Python/C++ wrapper** or how to use both languages for e.g. an analysis framework (but I am not sure if the essentials course would be the right place as it seems somewhat advanced and maybe not everyone needs it, as one probably sticks mostly to one programming language when writing frameworks)

▸ **Debugging tools**

▸ **debuggers**

DO YOU HAVE OTHER COMMENTS CONCERNING THE CONTENT OF THE EVENT?

▸ The contents was **good and pretty advanced** topics that I did not know but glad to know and learn.

▸ I'm hoping to ask questions in the mattermost channel in the future.

▸ Overall **very satisfied,** will recommend this to other students.

▸ No

▸ Personally, the hands-on session is worth it only if creates an environment for sharing knowledge. If I have to spend 2h in silence, it becomes worthless for me.

▸ I **loved the content** of the event, and how everything was taught, **very well trained and experienced teachers** in the area

▸ I found the content to be a **bit overwhelming**, especially considering we did not have time to cover the entire planned curriculum.

PLEASE LEAVE US A COMMENT ON ANY OF THE POINTS (SATISFACTION METRICS) IF YOU LIKE

▸ I was genuinely **impressed with the morning presentation**. The presenters explained the concepts with remarkable clarity, which helped me understand the material much better.

▸ The content covered most of the useful and tricky points when learning C++. I would go **deeper in** some features like **containers, general good practices and tools**, and **less deep** in features that are less used in physics, like **templates** (which I would move to the advance course). I use containers and tools every day, but templates are much less often needed. Regarding the afternoon hands-on session, in general ok, but I personally like when there is some kind of interaction with the mentor and also the mentor catalyze the interaction among the students (**Laura and Andre did a nice job**).

▸ All lecturers and tutors were very open to questions and discussion, which I think is crucial and very much appreciate. With my level of pre-knowledge, I didn't have time to process the amount of information presented in the morning lectures and would probably have needed more concrete examples. I also find listening for more than 30-45 minutes quite tiring.

IF YOU FELT UNPREPARED AND CONFUSED AT ANY POINT, PLEASE ELABORATE ON WHAT WE COULD HAVE DONE BETTER.

▸ Some topics seemed more difficult to grasp, but there was a correlation of time-in the lesson, so perhaps two breaks would have done it for me.

▸ Confused just by like one or two exercises, where it was not clear to me what I should do. e.g. the exercise on Friday, where we had the vectors and the question was like "**use another template parameter to sort vectors manually**". And my idea was first to write a new function which sorts already existing vectors, but rather the question was to change the already in place being "add" function so that when creating a vector it gets sorted the right way. Otherwise, from like the level of the exercises and in comparison what was in the lecture, the **exercises were perfectly fine for me**!

▸ For me the **Monday lecture was a good amount of new information**. The later lectures, I believe I would have needed less new content and more examples, perhaps paired with shorter exercises, in order to take in the content. The **afternoon session tutors were very good at and open to explaining**, but I found the exercises to be a bit too open. I sometimes found it hard to understand what I was actually supposed to do.

▸ Few times I **struggled a bit understanding the syntax**, but I guess due to the fact that I've never used C++ like in the course, but just to work a bit with ROOT. Anyway, I appreciated the fact that the **lecturers and the mentors were very happy and clear to answer question**, also very basic ones. I think that could be very helpful to have **more time in the afternoon** also, like one hour more, to take advantage of the small working group and the mentors.

▸ it was just a bit **fast on the last lecture**

DO YOU HAVE ANY COMMENTS ON THE EXECUTION OF FUTURE EVENTS?

▸ So far perfect

▸ Keep on the good work!

▸ I felt that there were **too many questions** during the session, which prevented us from covering all the essential content. While I appreciate the importance of asking questions, perhaps encouraging people to ask questions in **Mattermost** during and after the session could help reduce the number of interruptions during class time and allow us to cover more material?

▸ No additional comments

▸ As mentioned before, for me to be **on site at CERN was a very good decision**. But also, not everyone interested in such courses may be in the position to come to CERN. And since the **hybrid** format went so well in my opinion, I think it **can stay** the same for future events. Also I do not know if I can be arround for other events in the future, so it would be nice, if a virtual attendance would be possible. (Also if you would have like the **same courses like two times**, one just virtual and one just online would also be fine as one could chose which one to attend. But that's would also take **more time and effort** from you, the organizers)

▸ I think courses like this could benefit from some kind of **social event** in the beginning of the week, to facilitate making connections to fellow course participants. I believe making it more natural to connect to and, crucially, discuss with fellow course participants is a great help in learning.

LAST POSSIBILITY TO COMMENT

▸ I forgot to mention maybe some of the leaders in the **breakout rooms might share screen** in order for us to see what is the exercise about, some did some did not. Just a suggestion.

▸ I don't remember if I have already requested it through the various Google docs, but I would like to receive an attendance certificate.

▸ Thanks a lot for organising this!

▸ Maybe a **more structured exercise** where individual tasks are discussed at the end with the solution would be nice. This was not the case every tutorial session, but when it was done, I learned some things that I had not noticed before. Overall, the **time for the exercises was very tight** on Wednesday and Friday, but to change this without changing the whole schedule (and the days off) would be very difficult I assume. Overall I just wanted to mention here that I really liked **the course and I think it helped me a lot!**

▸ There was a tendency of some course organizers to interrupt the main lecturer with sometimes quite long comments. I found this to be distracting and a bit disruptive, especially since the main lecturer repeatedly stated that we were short on time.