In a typical psychology lecture, interaction between lecturer and students as well as student-student interaction is minimal. A potential cause for in-class passiveness could be the physical learning environment, with certain seating arrangements, specifically traditional rows, hindering class participation.

Albeit traditional seating rows are appropriate for individual work and time spent on tasks, current research indicates that this type of classroom setting is not optimal for feedback and interactive learning. In comparison, semi-circle and U-shaped seating have been suggested.

A more flexible seating arrangement that also enables students to face each other may provide greater sense of autonomy and balance rigid power dynamics between students. Moreover, such an arrangement can facilitate the construction of knowledge, express opinions, ask questions, and eventually increase engagement in critical debate.

### Study objectives

How do different seating arrangements modify student experience during a lecture, in particular:

1. **Does the seating arrangement influence student participation in the classroom?**
2. **Does the seating arrangement influence student connectedness and motivation for class discussion?**

### Method

**Participants:** Third year Social and Health Sciences students at Abertay University (N=58), including 11 males, 45 females, 2 unspecified, with a mean age of 21.5 (SD = 2.87).

**Conditions:** In-class behavior was compared between three different seating arrangements: 1) tablet chairs in forward-facing rows (fig. 1); 2) tablet chairs in rows of semi-circles (fig. 2); 3) swivel chairs in rows of semi-circles (fig. 3).

**Procedure:** The lecture was divided into three sections, lecture, group task, and feedback. Engagement was measured through incidence and duration of predetermined off- and on-task behaviours (see table 1) by means of observation from 90s video footage within each section. Further, student to student connectedness was measured with the Connected Classroom Climate Inventory. Questions regarding in-class participation motivation were included (e.g., how motivated were you today to participate in class activity?).

**Analyses:** Independent t-tests were applied to measure increase in motivation and connectedness across all participants. In addition, paired t-tests were conducted for eight participants that were present in all three conditions. Based on the directional hypotheses (condition front-facing=semi-circles<swivel chairs), one-tailed p-values are reported for these tests. Incidences and duration of behaviours were observed in each classroom (see table 1) and recorded on video and analyzed using 2x3 ANOVA (behaviour: on/off; seating arrangement: front-facing/semi-circles/swivel chairs; lecture section: lecture/group task/feedback) on four participants that participated in all three conditions.

### 1. Results Observation

A very strong trend indicated that time spent (in sec) was overall more on- than off-task [mean=38.36 vs. 5.94, F(1,3)=9.29, p=0.056]. The length of the observed behaviours was dependent on the lecture section (F(2, 6)=7.51, p = 0.041). Visible behaviours lasted for longer in the group-task compared to the feedback section [mean=19.92 vs. 11.16, p=0.05, Bonferroni corrected].

Number of behaviours observed (see fig. 6) showed a significant interaction of type of behaviour and seating arrangement (F(2, 12)=5.868, p=< 0.039). Paired t-tests indicated a very strong trend for more on- than off-task behaviours in the swivel semi-circle condition [(t(12)=2.97, p=<0.059)] and significantly more on-task behaviour of that seating compared to the front facing [(t(3)=4.24, p=<0.05, Bonferroni corrected)].

### Conclusion

As predicted swivel chairs in semi-circled rows increased incidences of observed on-task behavior. Motivation was increased for both semi-circled conditions, however, connectedness for students attending all sessions was highest in semi-circled tablet chairs. Supported by open feedback it is evident that the learning environment has a significant impact on the student learning experience.

### Future directions and recommendations

At present we cannot distinguish between effects of chair type and seating arrangement in the third condition and further studies are thus needed. A study over the course of an academic year with different lecturers and degree programs will allow to assess the influence of course and lecturer characteristics. Moreover, since the lack of a table facility in our swivel chairs might have reduced the effect of the table facility on engagement and motivation, further research using swivel chairs that have a table facility as indicated in figure 5 are needed.

### Acknowledgements

This research was supported by the Abertay Teaching and Learning Enhancement Fund and special thanks go to Alastair Robertson (ATEL Director) and Lorna Edwards (CEO Abertay SA), and all volunteers. For more information contact the first author via email vilja.nitamo@hotmail.com.

### References
