



Andragogic learning styles:

Finding the best style for practical based science subjects.

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Introduction

Andragogy (teaching adults, (Shah, 2021)) is very different to pedagogy (teaching children (Abeni, 2020; Sufirmansyah, 2019)) yet it is much less researched. When andragogy is researched it is focused on higher education (HE) where the majority of adult teaching takes place but yet there are still many students (508,000) who are adults but study in a further education (FE) setting,

This study was to analyse data and find the most efficient way of teaching practical based science subjects to adults in an FE setting. This would allow institutes to plan accordingly and make sure they are adjusting their academia accordingly and including this in this curriculum. Also, this allows teachers to make active adjustments to their teaching practice, rather than management.

Methodology

Students participated in 6 practicals that differed in teaching styles. 2 that were teacher-led, 2 that were student-led and 2 that were 50/50. For each practical 15 students were asked to complete a questionnaire to let us know their feelings on the practical. Each student was also tested on their knowledge with a exam of 10 questions, scoring a maximum of 10 and a minimum of 0. All data was analysed using SPSS statistics using both a one-way ANOVA and a Bonferroni post-hoc analysis to see for multiple comparisons. A significance level of $P=0.05$ was set in all comparisons. The questionnaires and exams gave a large amount of quantitative and qualitative results to analyse. All participants were briefed before hand and gained consent.

Results

The students found the student-led practical better quality that the other 2 groups (non-significant result) with an average of 9.0 for student-led, figure 1.

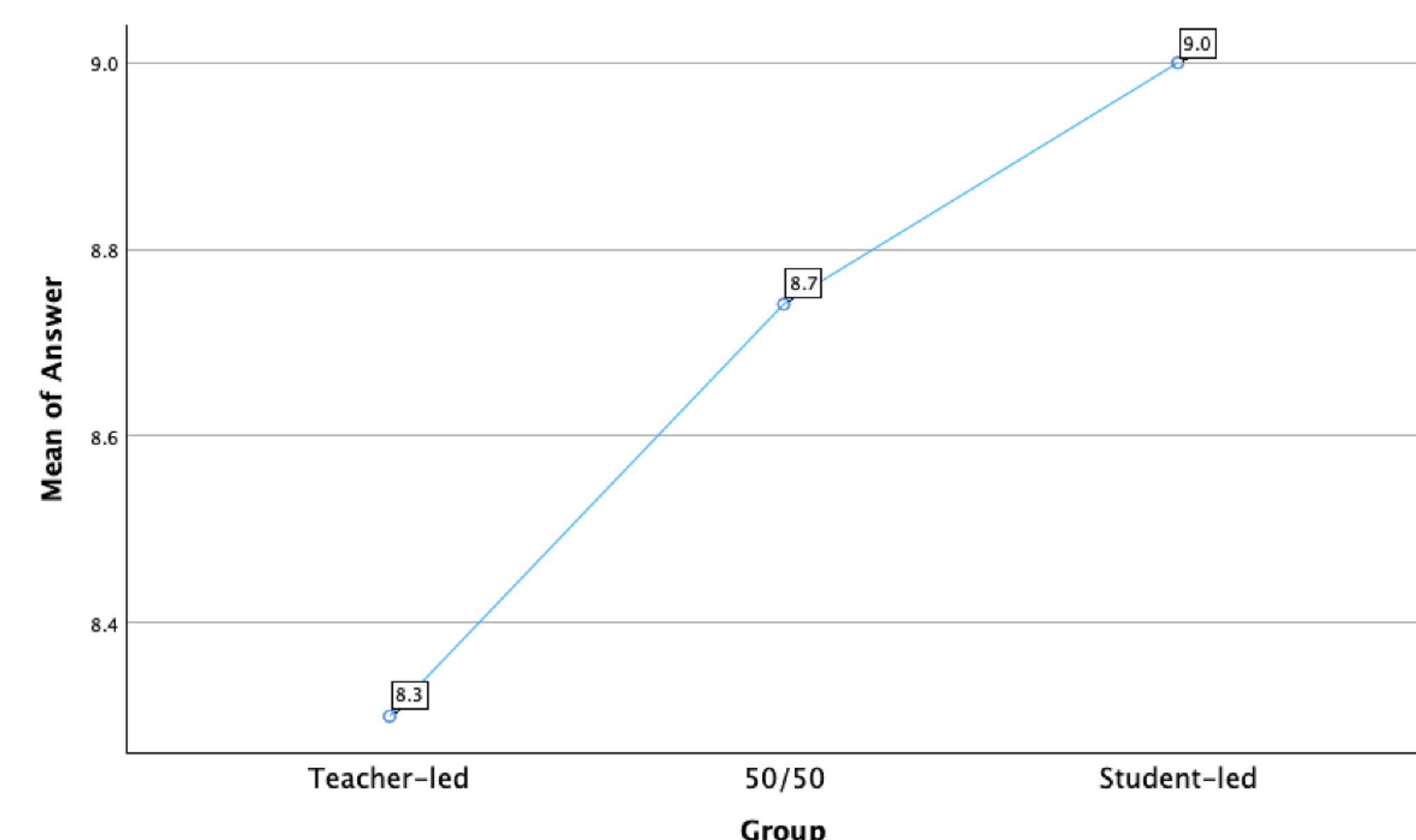


Figure 1. Graph to show mean result of overall quality of teaching style on practical. Created on SPSS with mean to 1 decimal place shown

The exam results painted a more detailed picture. The students scored a significantly higher score in the 50/50 teaching style (9.38 mean, $p<0.01$ for both 50/50 when compared to teacher-led and student-led styles). See figure 2 for results.

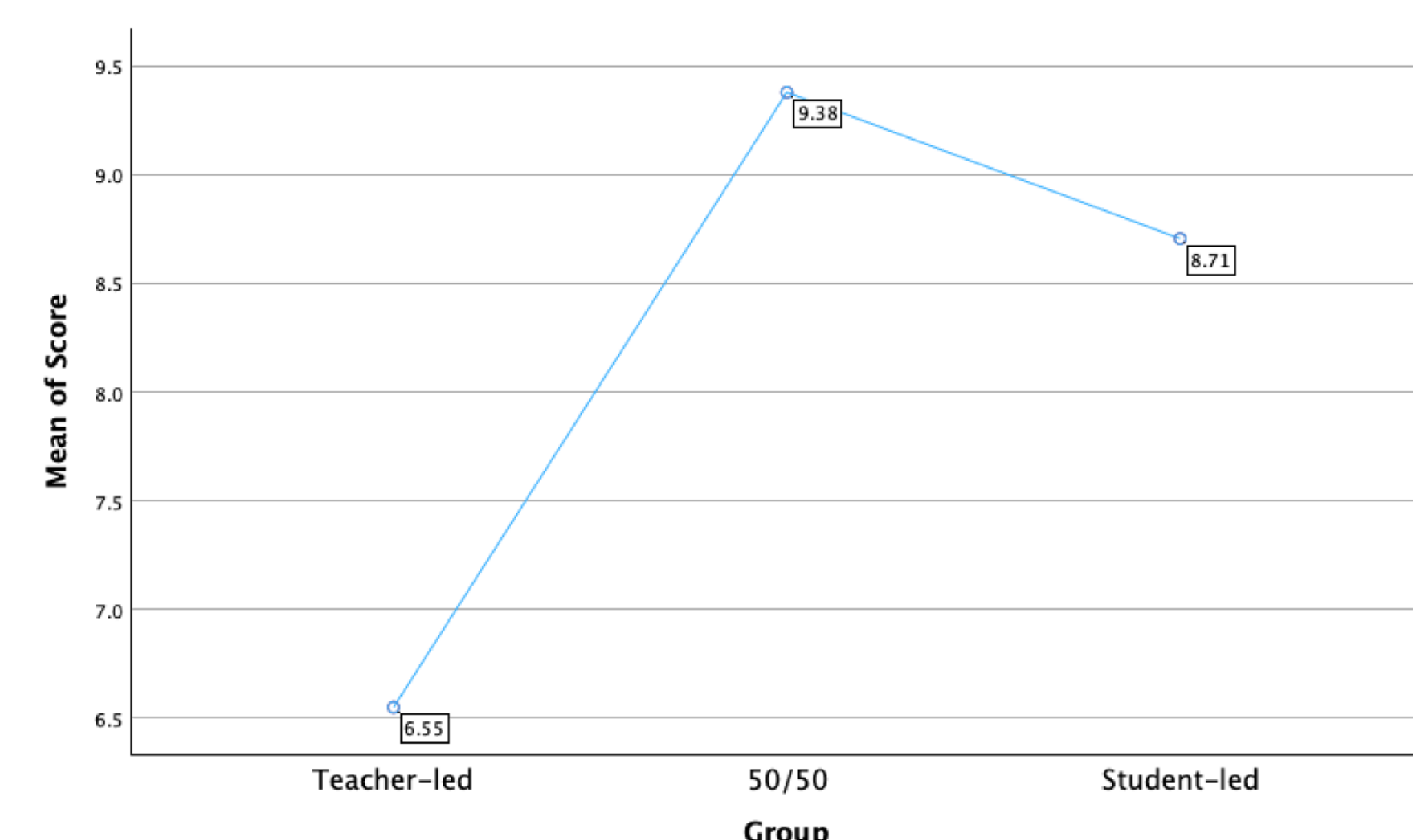


Figure 2. Graph to show mean result of exam score between 3 different practicals. Created on SPSS with data given to 2 decimal places.

The questionnaires provided qualitative around what the students enjoyed about the practical. The majority of the students discussed how they enjoyed the hand-on part of the practical and investigating what they could be different next time to improve. The negatives being that some practicals are dirty.

Discussion / Conclusion

It has been proven that adults need to be in control of their knowledge (Knowles, 1984). This explains how they find the practicals that are student-led better overall quality and as this is non-significant results it can be said that this may be due to their subconscious and not realise that they enjoy the practicals more.

Although. this is true it is also visible that they need teachers present to score the maximum that can. This can be explained with Kolb's (1984) experiential learning cycle which uses concrete experiences but also has sections which needs a teacher to reinforce (reflection, conceptualisation and experimentation). The teacher is vital here as adults returning to education in an FE setting will not naturally have these skills.

This higher grade with teacher accompaniment will allow the students to move HE settings, get better jobs and possibly change the future of the workforce. The evidence is explicit: To create a truly successful teaching environment it is necessary for the teacher to be involved but the learners should still be in control.

Further work

This project will culminate into further research into the preferred teaching strategies of different ages (16-18, and children). This could be investigated in HE settings as well, allowing institutions to plan their curriculum accordingly. This will end with a logn term plan into how learning styles change throughout a students life and how we can predict learning styles for individuals. This can then grow into specific conditions and other subjects.

Literature review

It is evident to see how much less andragogy is researched than pedagogy and why this discrepancy exists (Loeng, 2023). Pedagogic teaching styles (such as note taking and memorising) are no longer functional for andragogy and therefore need to be changed (Sharifi, Soleimani and Jafarigohar, 2016; Hughes and Yarbrough, 2021). Knowles (1984) states how adults learn is very different to children and state that they need to in control of their learning and yet at the same time need huge amounts of support and describe a cycle of learning. This combined with Kolb's (1984) cycle of learning shows how complex adult education is and how their teacher may not need to provide things that they will for children. Different subjects need to be taught differently as the content is different. For learning a science subject practicals need to come after theory, lanagugae shows practicals first but something like math describes how they need to be done at the same time (Ferlazzo, 2021; Hashemiparast, Negarandeh and Theofanidis, 2019; Wong and Nunan, 2011).

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