

Teaching Students How to Code Using Physical Computing Tools

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Raspberry Pi microcomputers, microcontrollers and 3D printing have great potential to engage students and provide innovative teaching of coding using a constructive pedagogy. This allows students to test algorithms by interacting with the physical world through moving parts and sensors and to learn engineering prototyping skills using 3D printing. In this project, we have been developing a Physical Computing L&T Toolbox for science and engineering in HE. Cross-disciplinary collaboration between students with a higher level of coding and electronic skills (computer science and electrical engineering students), and students from other science and engineering backgrounds is also being tested. Student's engagement with the physical computing activities has been outstanding, with over 200 registrations per workshop achieved in 48 h. Student's attitudes and perceptions of learning have been gathered using surveys and focus group discussions. The majority of the students perceive the topic as very interesting and agree that it should be embedded in regular course content. Although further research is still required, it is expected that this is linked with the fact that students report an average increase of their confidence in coding of 2 out of 10 points after attending one workshop. More importantly, there was an 80% reduction in students reporting less than 5 out of 10 points when rating the confidence in their coding skills after taking 1 workshop.