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Physics teacher education in Finland and reasons underlying the top scores of Finnish students on international assessments

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In Finland physics teachers have Master's degree in physics and pedagogical studies (60 cr). In addition they have introductory and intermediate studies (60 cr) in minor subjects, normally in mathematics and chemistry. The degree consists of 300 cr minimum and takes 5 years or more. In Bachelor studies (180 cr), almost identical in all Finnish universities, student teachers do the same physics courses than physicists (70 cr). Few exceptions can be found, e.g. in Joensuu we have two laboratory courses (5 cr) for student teachers. Part of pedagogical studies (25 cr) and some minor subject studies are included in Bachelor studies. Master studies (120 cr) differ more from university to university. Some universities do not make a difference between student teachers and forthcoming physicists but for instance the Universities of Joensuu and Helsinki offer several special courses for student teachers. These special courses include elements from different areas, e.g. the history of physics or the philosophy of physics, or the courses can concentrate on students' pre-knowledge or to foster students' conceptual and structural understanding of physics. In addition master's thesis can be done in the area of physics education. In summary, significant differences between universities can only be found in Master studies. However, there is no evidence that special courses for teachers produce better results than traditional master's physics courses. In fact most of the Finnish in-service physics teachers have done the traditional physics courses that do not include any influence from physics education research. Teacher education is surely one factor underlying the top scores of Finnish students. However, it is not only one and many other reasons can also be presented.