

Università degli Studi di Salerno



Dipartimento di Fisica "E. R. Caianiello"

Dottorato di Ricerca in Matematica, Fisica e Applicazioni
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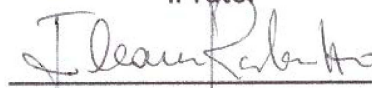
TESI DI DOTTORATO

Metodologie didattiche per l'insegnamento-apprendimento della
Fisica: studi di caso nella Scuola Secondaria di II grado.

CANDIDATO: **ROBERTO CAPONE**

COORDINATORE:
PROF. SANDRO PACE

Il Tutor



Abstract

The present work focuses on case studies conducted from 2014 to 2016 in Secondary Schools in Campania where new teaching methodologies for teaching - Physical Learning have been experimented. Of these methodologies, merits and limits are highlighted and each case, as an example of good practice, shows the possible replication in other contexts. Work is to be a didactic-epistemological attempt to address learning-learning issues also in relation to teacher training needs. Case studies cover some salient themes of physics, from mechanics to modern physics but also replicable in other contexts and in relation to other topics.

The following methodologies have experimented: situated learning, flipped learning, Inquiry-Based Science Education (IBSE), Digital Storytelling, Educational Robotics, Action Research, Scrum methodology. The experiments were presented at national and international conferences (AIF Perugia 2014, AIF Trento 2015, AIF Assergi 2016, SIF Roma 2015, SIF Padova 2016, GIREP Wroclaw 2015, DIFIMA Torino 2015, HPM Montpellier 2016, WCPE San Paolo 2016) Have been published in international journals or conference proceedings, others are being published.

In addition, some experimental activities have been welcomed at the City of Science as an example of good teaching practice at the "Three Days for School" (2015) and the Picnics of Science (2016). An activity was presented at the International Forum SkySEF 2015 in Shimizu, Japan, receiving appreciation from the jury of experienced teachers at Shizuoka University.

Finally, training courses were held in the Campania area for teachers on skills education, in the three areas of knowledge, Pedagogical Knowledge, Subject Matter Content Knowledge and Knowledge Curricular Knowledge, which includes programs, materials, and teaching tools, software (Shulman). The didactic activities carried out during these three years have been shown to teach teachers how to implement effective classroom action in the classroom, how to make an intervention product, how to form an authentic test. Of these training actions, the reports have been collected and included in this work.

The research methodology implemented falls within the framework of Educational Reconstruction (Kattmann et al, 1995), which allows studying the teaching phenomena by designing and realizing learning environments, artifacts, teaching/learning sequences that the researcher experiences, evaluates, re-elaborates and develops in authentic educational contexts. The study is contextualized in the theoretical/epistemological framework of Enactivism and, in particular, the cognitive theory that is being considered is the development of knowledge through model building.