



**Universidade do Minho**

Institute of Education  
Research Centre in Education

# **SCIENCE TEACHER EDUCATION IN PORTUGAL**

## **is a sustainable future still possible?**

**ATEE 2018**

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# Context of the research

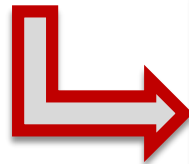
## □ In the 1970's decade

- New universities were created in Portugal (e.g., University of Minho)
- Initial teacher education programmes were approved
- Full qualified teachers started being trained through 5 year degree teacher education programmes (*licenciatura*)
- Teacher education programmes included training on:
  - Subject matter to be taught
  - Education (psychology, sociology, curriculum, school management, ICT)
  - Subject pedagogical content knowledge
  - Teaching practice

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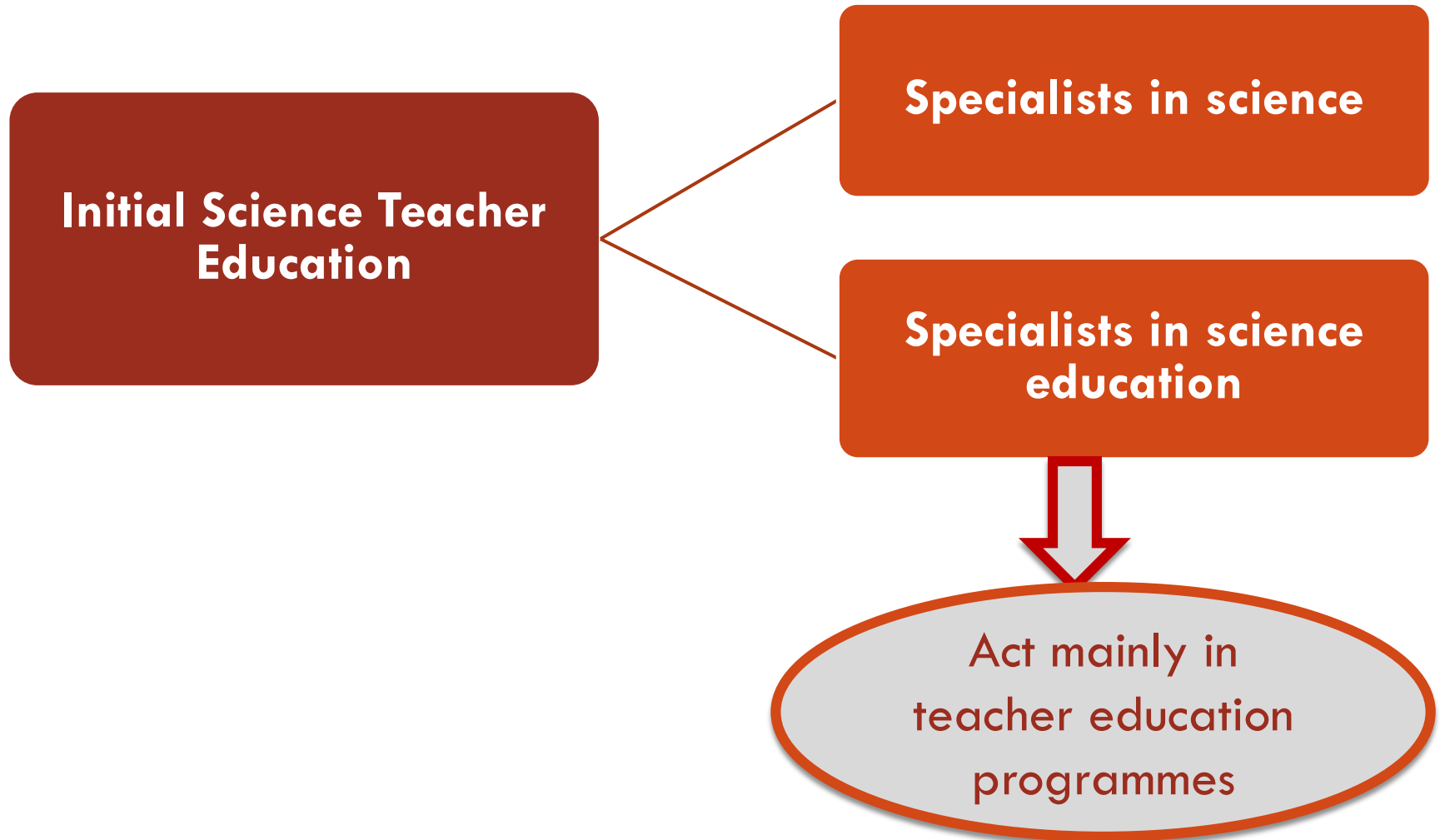
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### **Beginning of 21st century**

- All Portuguese school teachers fully qualified as teachers

# Context of the research



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- **Since the beginning of the 21<sup>st</sup> century**
- Newly formed science teachers are not entering schools, among others, for demographic reasons
- The number of candidates to TEP started decreasing and reached a minimum by the time of the creation of the TE masters' programmes (after a degree on the subject) → 2007
- Consequences
  - ▣ Universities are rarely able to run TEP
  - ▣ University science teacher educators are not hired or replaced

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## **Shortly, there will be:**

- no qualified science teacher educator at the universities
- no newly qualified school science teachers to replace their counterparts who retire

# Context of the research

- **In 2016 and 2017 government published the scientific employment law**
  - Employment for three year-long fellows (compulsory for the host institutions)
  - Employment for newly formed PhD (PhD individual applications)
  - Employment through universities application



**All knowledge areas**

# Research Objective

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- **To investigate:**
  - what sort of future do Portuguese science educators anticipate for science teacher education in the country
  - what they think that needs to be done so that science teacher education can still have a sustainable future



# Methodology

## □ Population and Sample

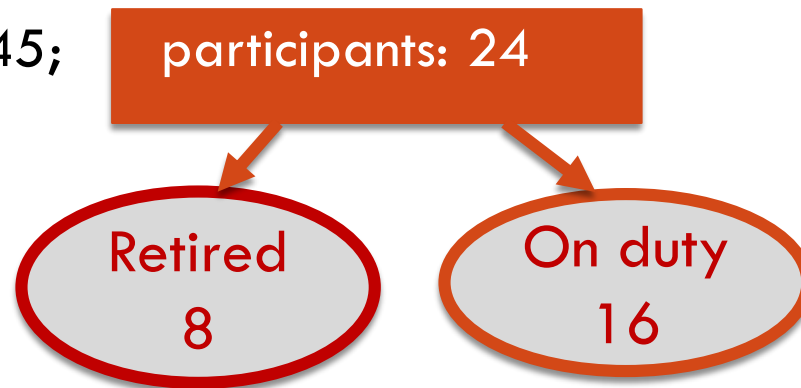
- Science educators associated to all Portuguese universities that are /were used to train science teachers (for grade 7<sup>th</sup> to 12<sup>th</sup>), either retired or still on duty
- All of them had been awarded a PhD degree either in science education or in one of the four sciences but moved to science education (teaching and research) sometime afterwards

# Methodology

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■ Invited people: 45;



■ Teaching experience: 4 less than 20 yrs; 10 more than 30 yrs

# Methodology

## □ **Research technique**

- Open-ended online questionnaire on initial teacher education: past, present, future, reversal of the situation; and political discourse
- Approved by UMinho ethics board
- Starting with mandatory question relative to informed consent

## □ **Data collection**

- Questionnaire web link sent to the e-mail of the target specialists with a message explaining the context and scope of the study and informing about ethic issues

## □ **Data analysis**

- Content analysis for open ended questions

# Findings - Past

## Quality of ITEP in Portugal, before the Bologna process, versus other European countries

### □ **Majority: better**

- “It was several steps ahead. Indeed, completing the initial teacher education programme [in Portugal] would require domain of scientific and educational areas, and a full year of immersion in the school, for professional practice. In Europe, there were several countries where the initial teacher education programme was focusing on the scientific domain only , where there was none or little educational component, and professional practice was limited to some shorter periods in school.” (D11)

# Findings - Past

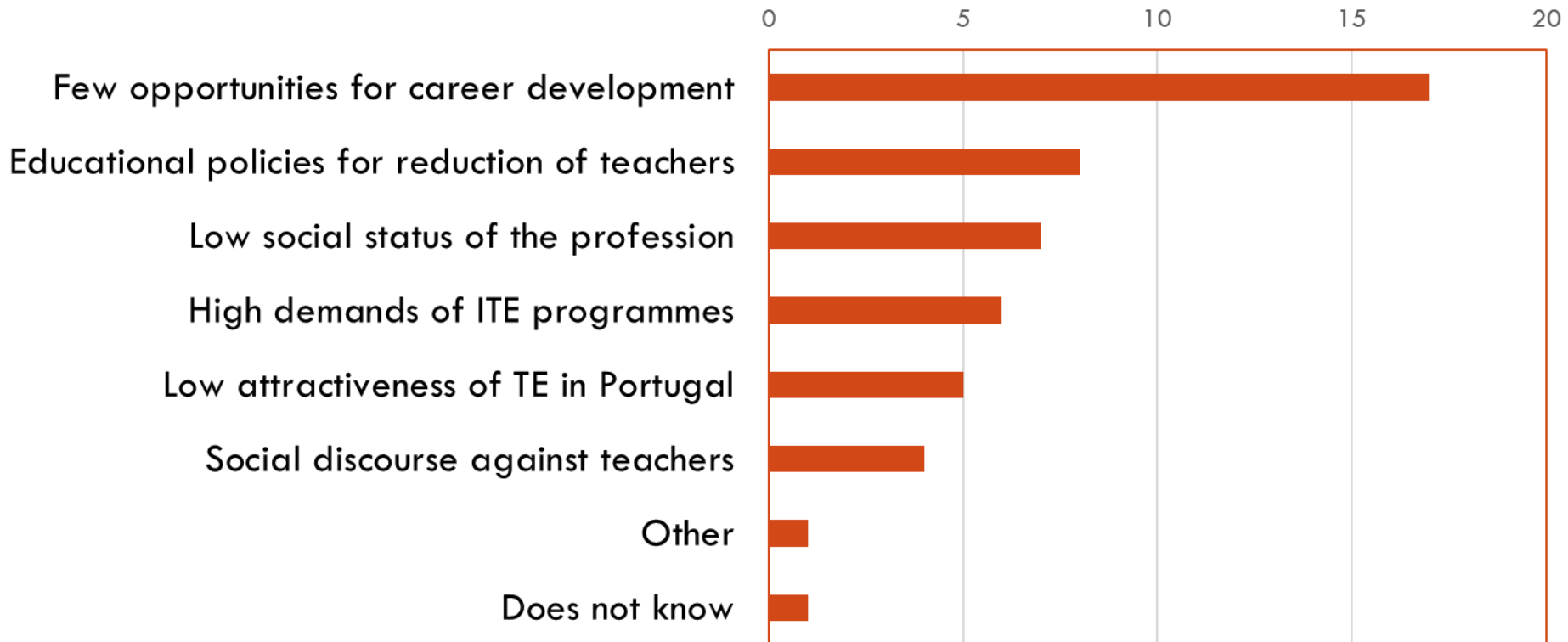
## Quality of ITE Human Resources in Portugal, before the Bologna process, versus other European countries

### □ **Majority: better**

- “Overall, the quality of human resources in Portugal was very good, having in consideration the university teachers responsible for the scientific and educational components of the teacher education programme, as well as the school supervisors. I don’t think this trilogy of resources, working in cooperation, existed in other European countries [...] We had already gone through several decades of science teacher education when the Bologna process appeared, so there was already a huge concern with the quality of their education at all levels and, particularly, at the human resources selected.” (D11)

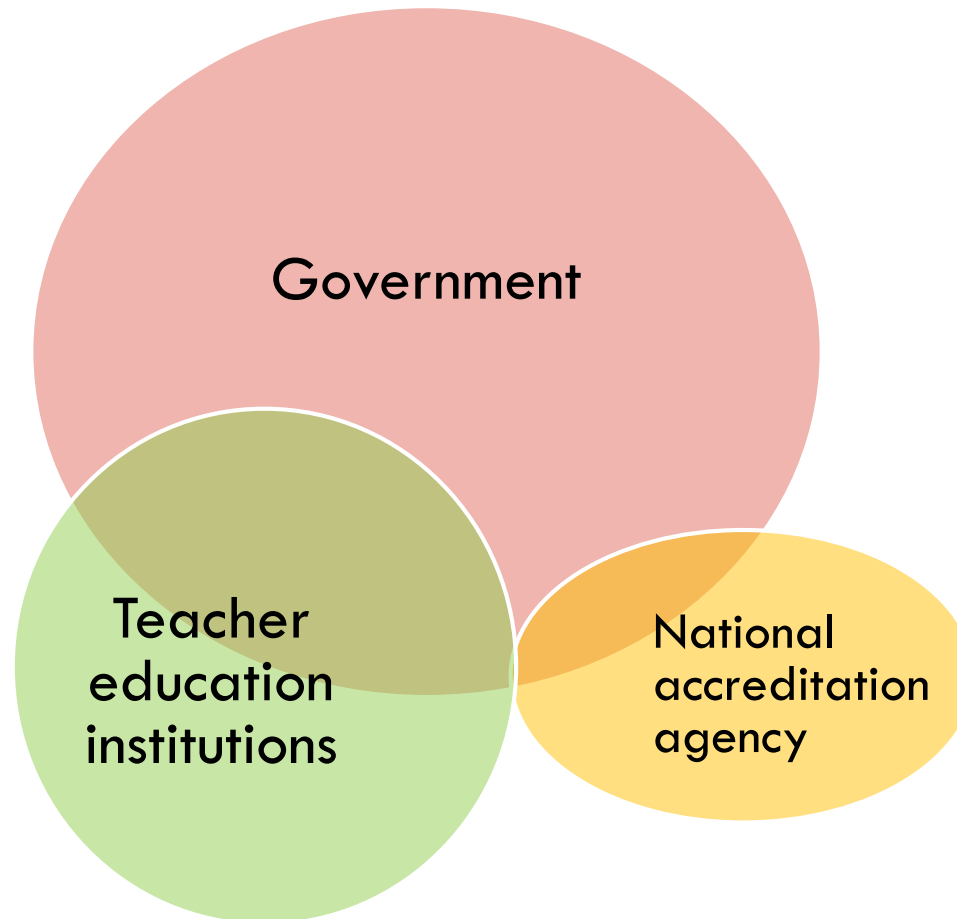
# Findings - Present

## Factors for the reduction of the number of candidates to ITEP



# Findings - Present

**Responsibility for low numbers of candidates to initial science TEP**



# Findings - Future

## **The consequences at the university level of the low number of candidates to initial science TEP**

- Under use of the body of knowledge on ITE which was developed
- Loss of institutional competences on ITE
- Out datedness of teaching materials
- Extinction of ITE programmes
- Extinction/reorganizations of university departments



# Findings - Future

**The consequences at the university human resources level of the low number of candidates to initial science TEP**

- University TE staff's reorientation
- Unemployment among TE staff
- Non-renewal of the university TE (science education) staff
- Reduced chances of TE staff progression

# Findings - Future

## Consequences at the secondary schools of the low number of candidates to initial science TEP

- “At short term, **aging of school teachers**. At long-term, **lack of teachers**, with the consequent foreseen **risk of short and fast TEP being created** to overcome the problem, as it happened after the 1974 revolution” (D4)
- “According to some research studies [...], until 2030, the need for school teachers will be low. However, **school teachers’ aging**, as well as of the danger of **their knowledge becoming outdated** should be considered. This is **specially** true for knowledge on **teaching methods** suitable for the development of **cross curriculum competencies** which are acknowledged as being needed during the next decade, 2020-2030” (D22)

# Findings - Future

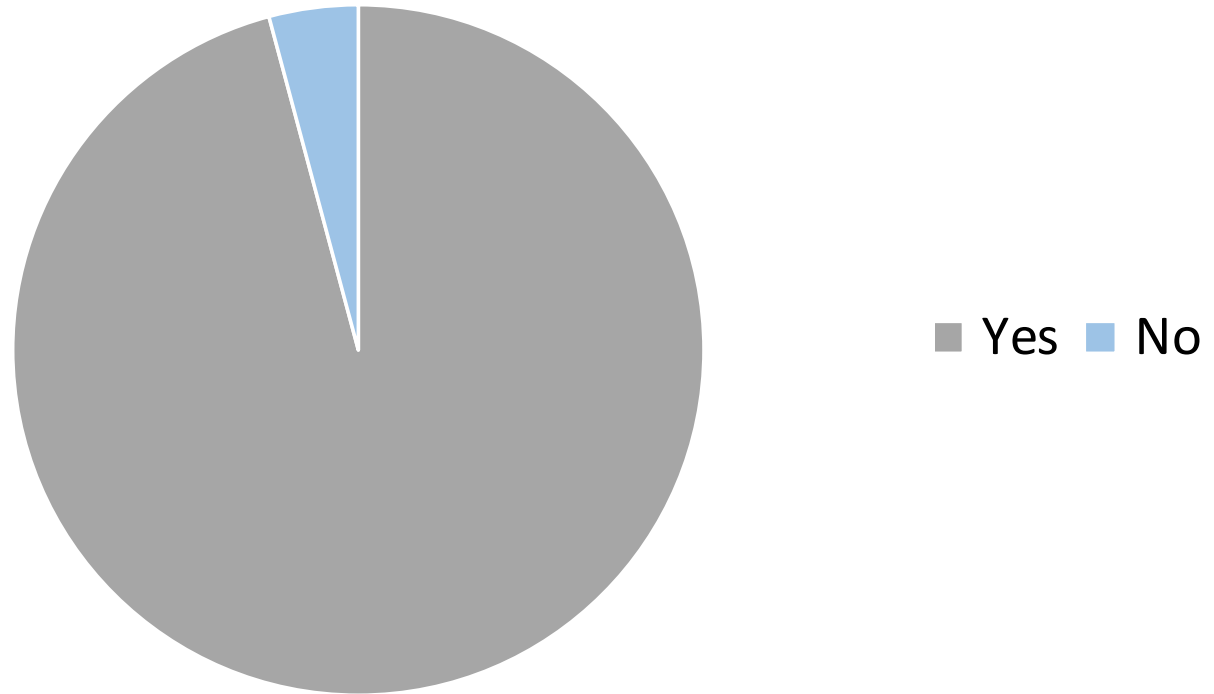
## The consequences for society of the low number of candidates to initial science TEP

- Reduction of the number of 'good teachers'
- Reduction of citizen's scientific literacy
- Reduction of the interest for science and technology careers
- Existence of **schools for elites** versus schools for common citizens



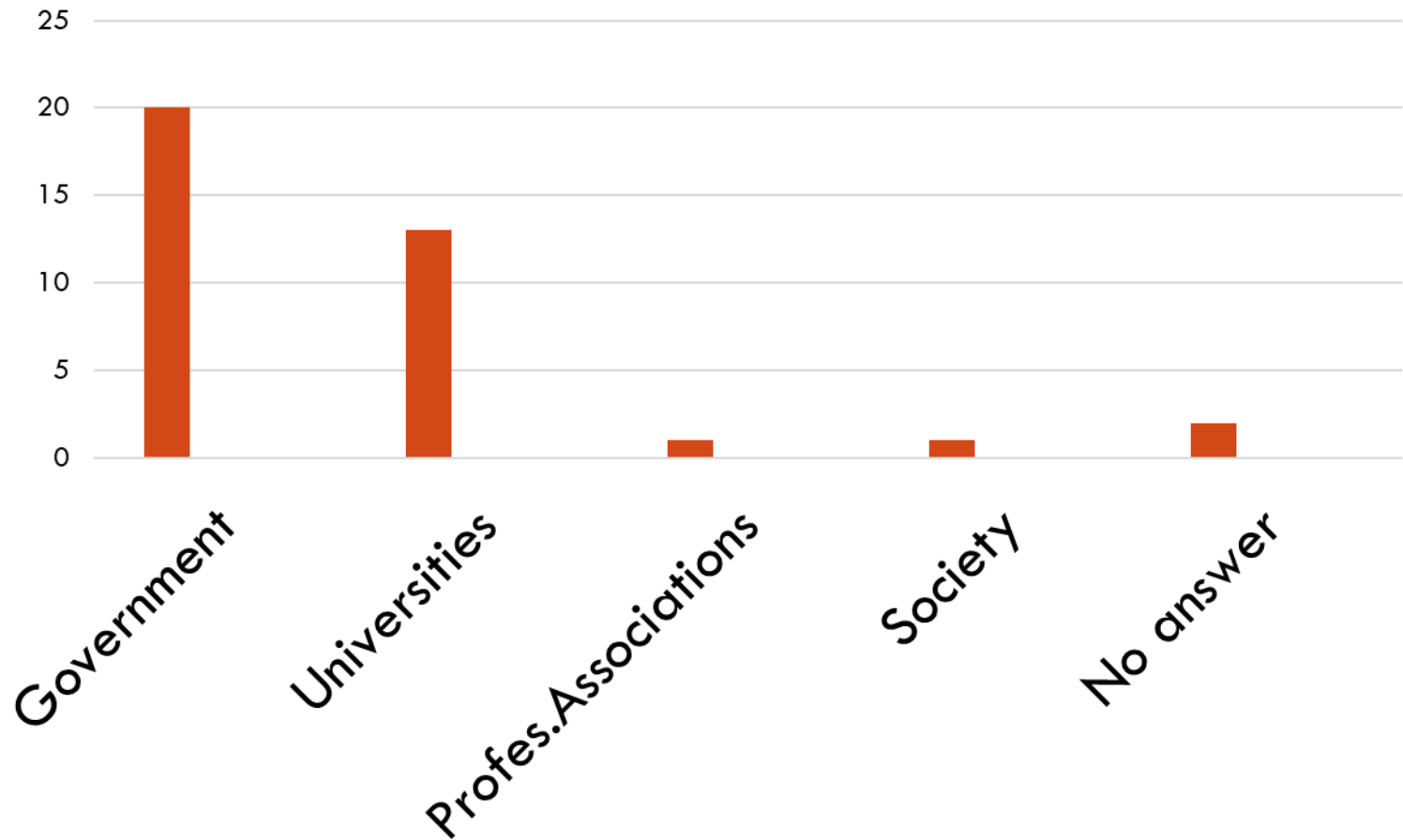
# Findings - Reversal of the situation

**University teachers' opinion on whether or not the current situation about initial science TEP can be reversed**



# Findings - Reversal of the situation

If the situation must be reversed, who should do it? (N=23)



# Findings - Reversal of the situation

## What should be done to reverse the situation?

- ❑ Create places for teachers in schools (new or by retirement)
- ❑ Engage in-service teachers in continuous training (with a leave)
- ❑ Offer in service training to update school teachers
- ❑ Value the teaching profession
- ❑ Find ways of attracting students to ITE programmes
- ❑ Run ITE programmes even with a few candidates

# Findings - the politicians' discourse

## Initial science TE versus the politicians' discourse

- ❑ Politicians' discourse and practice do not match
  - “The importance that politicians in their discourse assign to science and technology do not have correspondence in terms of measures to overcome the barriers that science TE is facing” (D14)
- ❑ Politicians do not really assign much importance to science / education
  - “Politicians are focused mainly on pure and applied science development and they are neglecting science education which is a factor for a more scientifically literate society” (D15)
- ❑ Politicians' discourse is harmful for teacher education

# Findings - the politicians' discourse

## Initial science TE versus the government' scientific employment measures

- ❑ Have no relation with science education
  - “Science Education is a small part of our universities. The focus of the law under question is not science education” (D20)
- ❑ May improve research on science education
- ❑ Are insufficient to improve science education



# Conclusions and implications

- **Findings suggest that Portuguese science educators**
  - are pessimistic about the future of initial science teacher education as well as about science education in schools
  - fear for the future of initial science teacher education as well as for the quality of science teacher educators
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  - they seem a bit unaware of the potential governmental support to science education research

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Invest in in-service science teacher education  
for science teachers' and science teacher educators' benefit

# Funding

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□ CIEd/FCT - Portugal

[www.cied.uminho.pt](http://www.cied.uminho.pt)

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**THE END**

**Thanks  
for your attention!**

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