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EDUCATION POLICY, MANAGEMENT AND QUALITY

CREATING A COMMON GROUND FOR PROFESSIONAL DEVELOPMENT OF UNIVERSITY CHEMISTRY (STEM) LECTURERS IN EUROPE

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Abstract

Today, we are faced with immense global challenges in finding sustainable equilibria between socio-economic, political, and ecological concerns. The European Chemistry Thematic Network (ECTN), the European University Association (EUA) and the European Commission are committed to sustainable improvement of the quality of university chemistry education to cope with these challenges. In this position paper, we advocate the creation of the Eurolecturer Academy (ELA), an innovative, European state of the art higher education learning platform serving academics in their continuous professional development of teaching competences and thereby supporting academics to educate students to be successful in the changing world. Within this newly established educational entity, there will be two levels of membership, Associated membership and Full membership. The ELA will not only facilitate continuous professional development of university teaching staff but will at the same time create a structure to support recognition of teaching competences of lecturers within the European dimension in teaching and learning. The certification will profit from the new 5th European Qualification Framework for micro-credentials, providing a much needed "academic currency"

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for the purpose of recognition of academic credentials. The ELA micro-credentials will be issued by certifying the learning outcomes of short-term learning experiences in the field of teaching and learning in higher education. The ELA will provide a micro-credentials catalogue that will address the needs for professional development of lecturers and ensure the quality of the micro-credentials through close cooperation with the internationally operating accreditation organization ASIIN (https://www.asiin.de/en/) using quality standards and valid assessment according to international best practice.
Keywords: *continuous professional development, chemistry education, Eurolecturer Academy, university teaching staff*

Introduction

Today, we are dealing with huge global challenges to establish sustainable equilibria between ecological, economic, and social concerns. Higher education and the promotion of critical thinking skills which are part of a holistic concept of competency (OECD, 2019) have become ever more important. European universities are challenged like never before to support the continuous expansion of knowledge, and skills on the part of students, lecturers, and other stakeholders in the process. In its recent publication, the European University Association (EUA) defined the paradigm of a "University without walls, Vision for 2030" (EUA, 2021), in which it promotes extensive and inclusive collaboration between European universities in order to solve the challenges that we encounter globally today. For teaching and learning, the goals and aspiration for 2030 have been defined and characterized as follows:

> *"University learning and teaching will be learner centered. It will be a collegial and collaborative process that involves the entire university community, as well as external partners. Teaching will be a core part of academic practice, closely linked to research activities and respected as scholarly and professional."*

The EUA's Vision for 2030 promotes interdisciplinarity and professional development of teaching staff and in addition stresses that the various academic disciplines must remain important in order to organize and to expand knowledge production at the universities. It is also worth mentioning, that in the Policy Briefing Recognition of professional qualifications (EUA, April 2022), the impact of the EU's digital transition is addressed as is the importance of adapting study programs accordingly. The importance of equipping students and staff across the EU with green and digital skills for the future is documented (European Commission, 2022) and it is recommended that the innovation and technology potential of universities is harnessed to tackle related societal challenges.

In the area of research, considerable collaboration between EU universities, research groups and individual researchers has been in place for a long time already. In contrast, collaboration in the field of teaching and learning in higher education is not prominent on the agenda, although there is a large and unsatisfied demand for it in the education market and this has consequences for the quality of teaching and learning in higher education. We give five arguments that support this statement.

Argument 1. Mobility. With the introduction of the three-tier system in Europe (Bachelor – Master –PhD), academic and professional mobility has increased considerably.

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In 2018, 8% of all enrolled tertiary students were from abroad (Eurostat, 2020). Many students continue their master study in a different European country. Many doctoral students and post docs undertake their research abroad and this may also involve some teaching responsibilities, and many tenure track lecturers start teaching in a different European country. They all experience different teaching and learning "cultures". In this, academic teachers experience different requirements in relation to teaching quality. There are different levels of support for teaching and different approaches to how to organize continuous professional development (CPD) for teaching and learning.

Argument 2. Inclusivity. There are many researchers-lecturers who have been educated and subsequently work for their whole career at one university. They maintain rich contacts with other researchers in Europe and around the world but never collaborate in the field of education nor experience the teaching and learning culture of any other university. They teach students that come from different countries while their expectations from these students are based only on their own learning experience as students and their own university's teaching culture. This can result in unconsciously non-inclusive teaching.

Argument 3. CPD focus. At most universities, the courses or training in teaching and learning have a general pedagogical character but teaching STEM is different from teaching philosophy or languages. To some extent, STEM-CPD needs a disciplinary and interdisciplinary focus in order to develop a holistic concept of competency by students. Academic teachers have a certain level of autonomy and they decide what to teach and how to teach within their courses. They are expected to create a suitable and state of the art learning environment using digital technology. CPD in teaching and learning in higher education that aligns to the education vision of modern universities is indispensable (Brouwer, 2020).

Argument 4. Priorities and self-confidence. The balance of priority between research vs. education lies on the side of research in universities. When lecturers are approached to attend a CPD activity in education, many answer that they don't have time because they have to do research. There are also other arguments lecturers give: *"I know how to teach, nobody complained so far. Why should I invest my time that I need for my research in developing teaching skills?"*; "*I teach as I was taught myself. See, I became university professor*" or *"My students like how I teach"*.

Some lecturers see the quality of research as a quality of teaching: *"We are research-based university; I'm an expert in my subject that I teach. I don't need to be an expert in pedagogy*". *"My faculty is unique. We don't need any international experience or European dimension in teaching*". Other lecturers again are neglecting scientific evidence about learning: *"Student-centered learning is a fashionable but empty concept. I know better what students need to become professional chemists*."; *"Active learning doesn't provide thorough and error-free knowledge"*. There is however strong research evidence that proves the opposite (Freeman, 2014).

Argument 5. Recognition. There are already a lot of lecturers in Europe now who find it important to continuously professionalize their teaching competences, who are aware of the importance of disciplinary focus, and who recognize the need for the European dimension in teaching and learning in higher education. Their efforts and achievements are not currently recognized in the European space and also not to a sufficient extent by the institutions in which they work. On the European level, staff exchange Erasmus programmes are available. However, the experiences that we have collected at our institutions show that there is very

little exchange of education-focussed staff. The existing infrastructure is not sufficient to stimulate collaboration in education between the lecturers in different countries and to create a European dimension in teaching and learning in higher education.

European Chemistry Thematic Network (ECTN, ectn.eu) is one of the few organizations that has been addressing the quality and common ground of higher education Chemistry in Europe. In the context of the Bologna process and the EU project "Tuning Educational Structures in Europe", the ECTN developed a framework for the three cycles qualification in chemistry, the Chemistry Eurobachelor®, the Chemistry Euromaster® and the Chemistry Doctorate Eurolabel® (http://www.ectn-lc.eu/index.html).

We have demonstrated that there is an urgent need to establish a common ground for disciplinary and interdisciplinary CPD in Europe and to facilitate recognition of the efforts of the academic teachers who professionalize their teaching competences on a lifelong basis.

To fill this gap, we propose that the ECTN and ASIIN join their forces toward the establishment of the Eurolecturer Academy (ELA) which will create a common ground for the disciplinary and interdisciplinary focused continuous professional development in teaching and learning of academic teachers in Chemistry and related fields and which will promote the European dimension in higher education. The ELA is a concept that can be replicated or scaled up to all STEM disciplines and also other disciplines.

Development of the Eurolecturer Concept

The idea to recognize the teaching competences of European lecturers is not new. In 2010, the ECTN established a Working group Lecturing Qualifications to create a framework offering European certification of teaching competence of university teaching staff in Chemistry and related disciplines (Yates, 2012). The group conducted a Questionnaire concerning lecturing competences across Europe to map the professional development situation in teaching at the university at that time. The aim was to find out if there were any requirements for obtaining any kind of certification of lecturers, how training courses for lecturers were organized at the Universities and the characteristics of these courses. In the survey, the lecturers were also invited to give their opinion about a teaching qualification in higher education and to express their willingness to participate in obtaining it. Respondents from 90 universities within the ECTN network responded to the questionnaire. The results showed that there was a huge variation in the provision of professional development in the area of teaching and learning at university and certification of lecturers at that time. The results also showed the interest of scholars from the ECTN partner universities in obtaining a European university teaching certificate.

The ECTN working group developed a framework and a certification programme. A pilot project to award the Eurolecturer certificate was implemented. E-learning materials available on a website (Yates, 2012) supported ECTN network members who had committed to working towards a university teaching qualification. The elements of collaboration and dissemination were emphasized within teaching chemistry and European contexts. The process in the pilot was as follows: two candidates from different countries were assigned as partners along with a mentor from a third country. Collaborating pairs were asked to discuss a teaching issue or curriculum development that they had experienced. Subsequently the pairs collaborated to develop a teaching resource or innovation that could be implemented

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in both of their universities. To conclude the project and get the Eurolecturer certificate, each participant was asked to write a report on the collaborative work they had undertaken in the project, which was then commented on by their partner. On submission of a satisfactory report, which was assessed by the ECTN Working group leader and the mentor group, participants received a Eurolecturer certificate. They were given the opportunity to disseminate their work through any ECTN channel and on the group website (Yates, 2012).

The planning of the pilot was successfully realized. The mentor group was satisfied with the quality of the reports of the participants and all participants in the pilot received a certificate. They presented their reports at the plenary ECTN meeting in 2012. The certified participants were interviewed. They expressed satisfaction with the program and with their achievements. They also said that the program was very time consuming.

The ECTN Working group recognized several serious challenges to implementing the pilot more widely. The recruitment for the pilot using ECTN networking channels, including the plenary network conference in 2011 resulted in applications from six lecturers, one of whom subsequently withdrew because of work pressures and was replaced by a teacher who subsequently withdrew due to being on maternity leave. It was also difficult to recruit mentors with sufficient time to devote to the project. The low number of participants was very disappointing given the previous high level of interest expressed by network members in the questionnaire. The original intention to enhance the basic framework by input from those working towards the award and social connection had not proved viable. The website thus provided only the outline information and the results.

The pilot was not continued. The recommendation of the report of the ECTN Working group Lecturing qualifications was to provide support for the recognition of staff time when the participated as either candidates or mentors.

In 2021 the EU project STEM-CPD@EUni published a Roadmap (Grecea, 2021) to provide guidelines for local activities to meet the needs and expectations of STEM continuous professional development (STEM-CPD) of academic teachers. The Roadmap is based on a survey about the needs of lecturers for professional development in teaching. The results of the survey also show that professional development of lecturers in Europe gets more attention now than 10 years ago but that there is still not enough recognition of teaching competence and that there is no common ground in Europe about continuous professional development in teaching competences of academic staff. To fill this gap, the ECTN started a new Working group Eurolecturer Academy that developed the framework for the Eurolecturer Academy (ELA) that is described in this position paper.

Mission and Aim

The mission of the Eurolecturer Academy (ELA) is to promote good practice in teaching and learning in higher education and to improve awareness that continuous professional development of HE lecturers is indispensable for the quality and sustainability of European higher education. The aim of the ELA is to facilitate professional development of STEM lecturers in the EU context and to stimulate knowledge sharing. This will create a common ground for disciplinary and interdisciplinary CPD in teaching at European universities, starting with Chemistry and related disciplines. The ELA will actively promote collaboration between STEM lecturers in Europe and improve the recognition of lecturers

who invest in their continuous professional development on teaching and learning in higher education in their discipline and who support others to do the same. The ELA will provide a catalogue of micro-credentials which by achievement will recognize STEM-CPD competences of higher education lecturers on the European level.

The ELA primarily strives for three competences of lecturers at the European universities on the level of awareness and attitude:

- European dimension in teaching and learning in higher education
- student centered learning
- inclusive education

The ELA will unite academic teachers in promoting student centered learning according to the principles of inclusiveness and universal teaching design in higher education and will share the experiences about it globally. The ELA will encourage an evidence informed approach and discipline-based education research using PCK (Shulman, 1987) and TPACK (Mishra, 2006) models and facilitate forming of communities of inquiry of lecturers. The ELA will be part of the European Chemistry Thematic Network (ECTN).

Conceptual Foundation

The theoretical underpinnings of the Eurolecturer Academy are constructivist learning theory, a learner-centered approach and scientific teaching (Biggs, 2011, Handelsman, 2004, Freeman, 2014, Couch, 2015). The use of digital technology in education nowadays has become self-evident and indispensable. Lecturers need to construct their technological pedagogical content knowledge (TPACK, Mishra, 2006). This is an important dimension in developing teaching competences and improving the quality of teaching at the university. Professional development in teaching and learning is necessary to equip lecturers with the skills to support their students in developing their critical thinking skills as a part of a holistic concept of competency. CPD is a lifelong process and it should be closely related to teaching (working) practice and aligned with the needs of the lecturers participating. In STEM-CPD@EUni EU Erasmus+ project (2020) a survey is developed to define the professional development needs of lecturers according to the experience of lecturers and education managers at universities in different countries. In the *Roadmap for STEM Continuous Professional Development at European Universities* the needs for continuous professional development in STEM that were defined in 2020-2021 are presented and the recommendations and guidelines for STEM-CPD are provided (Grecea, 2021, Brouwer, 2021). Now, it is necessary to have a structure to stimulate and support the recognition of teaching competences of lecturers in Europe. The certification of academics in ELA will profit from the new 5th European Qualification Framework for micro-credentials. The European project MICROBOL (2022) developed a Common Framework for Micro-credentials in the EHEA:

Micro-credentials are designed to provide the learner with specific knowledge, skills, and competences that respond to societal, personal, cultural, or labor market needs.

Micro-credentials are designed to be modular so that other micro-credentials may be added to create larger credentials. Micro-credentials are subject to internal and external

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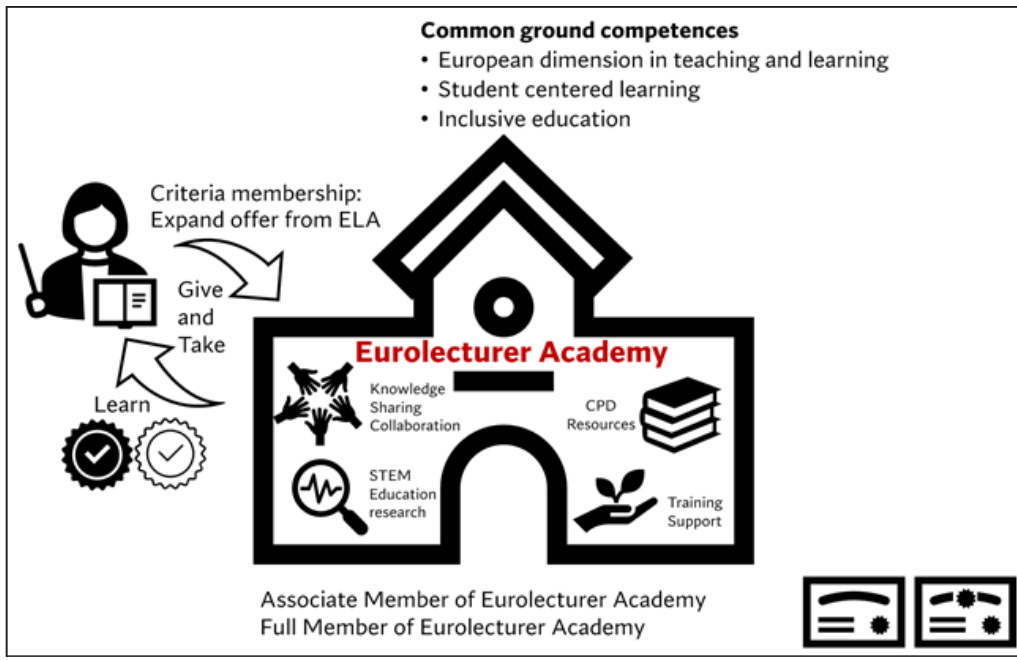
quality assurance by the system producing them. The micro-credentials issued for CPD will provide recognition for lifelong learning achievements by certifying the learning outcomes of short-term learning experiences in the field of teaching and learning in higher education. ELA will provide a micro-credentials catalogue that will follow the defined needs for professional development in teaching of STEM lecturers (Grecea, 2021). This will offer a flexible and targeted way to help academic teachers in their continuous professional development and provide a relevant response to higher education needs.

The ELA will provide the quality of the micro-credentials content, description and enable transparency. In collaboration with the accreditation organization ASIIN (https://www.asiin.de/en/), quality standards and valid assessment will be assured by following a qualification framework. This will create a common ground in STEM-CPD in Europe.

The members of the ELA share three common ground competences (Figure 1): (1) European dimension in teaching and learning in higher education, (2) Student centered learning, and (3) Inclusive education

Figure 1
Eurolecturer Academy



The ELA will stimulate continuous professional development in teaching competence at European universities by (a) promoting the CPD-Ambassador principle of collaboration (Brouwer, 2020), (b) organizing different activities for STEM disciplinary and interdisciplinary professional development, and (c) providing CPD resources. The ELA will facilitate the European dimension in teaching and learning through different platform activities and through collaboration between the lecturers, the ELA members in different EU countries.

The ELA will be the community platform of European lecturers and CPD-Ambassadors for collaboration and knowledge-sharing in teaching and learning and in professional development across universities in the European context. It will stimulate an evidence based teaching approach and creation of discipline-based education research communities (Henderson, 2017).

Activities

The activities in the Eurolecturer Academy will contribute to the creation of a common ground for STEM-CPD in Europe. The activities can be face to face or virtual. The Eurolecturer Academy will have a website to inform audiences about their mission, their membership, and their activities. The ELA will provide learning resources for self-supportive learning, short (open) online courses in teaching and learning in higher education, e.g., microMOOCs, and webinars. The ELA will organize yearly at least one STEM-CPD Summer School for the CPD-Ambassadors.

The CPD activities of the ELA members can be:

- sharing experience
- (online) collaboration in education with ELA members in another country
- attending and/or organizing webinars to share knowledge about teaching and learning in higher education
- following short (online) courses on teaching and learning
- participating in STEM-CPD Summer school for CPD-Ambassadors
- creating/participating in communities of evidence based teaching and discipline based educational research
- proposing new activities at the ELA

The ELA will provide a STEM-CPD catalogue of micro-credentials in teaching and learning for recognition of lecturers' competences. A knowledge sharing platform connected to the ELA website, Starfish (starfish-education.eu), will facilitate knowledge sharing among the ELA members. Twice a year a newsletter will be sent to all ELA members. There will be a yearly meeting of the ELA members organized at the ECTN General assembly.

The resources that are already developed by the Erasmus+ STEM-CPD@EUni project will be used and further developed in the ELA, in particular the STEM-CPD Summer School, the collection of STEM-CPD User cases on Starfish and the microMOOCs on Open EdX platform (Brouwer, 2020; Brouwer, 2022).

Membership of Eurolecturer Academy

The ELA will provide its members with many opportunities for informal and formal learning about higher education.

The membership of the ELA will be based on three co-operating principles:

- Give and Take
- Wish to learn something new for own teaching practice
- Expanding what the Eurolecturer Academy is offering

The principle of "give" in "Give and Take" means that, when applying for ELA membership, all new candidate members will make a short proposal on how they will

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improve or expand the ELA's offerings. The “take” on the other hand means that applicants will have to define (at least) one learning goal, i.e., what do they want to learn for their own teaching practice. The proposal on what to learn is based on the intrinsic motivation of applicants: wishing to learn something new. The “Give and Take” principle supports sustainability through the expertise and input of the academy’s own members. All members of the ELA are expected to contribute to expanding what ELA is offering.

Some CPD activities will only be available for the members of the academy. Different short professional development teaching and learning activities will also be available for lecturers who are not ELA members. By successfully completing these activities, this will give them the possibility to earn micro-credentials that prove the achievement of specific competences in teaching on the European level.

There will be two levels of membership in the ELA: Associated membership of the ELA and Full membership of the ELA. Membership enables the use of specific facilities of the ELA and contribution to its resources.

Associated Membership of the Eurolecturer Academy

The prerequisite to become an associated member is minimally 2 years of teaching experience in STEM higher education. Next the applicant needs to submit a short proposal that includes the following three parts:

- Description of applicant’s educational vision
- Description of how the applicant wishes to expand the Eurolecturer Academy (share good practice or participate in organizing activities or develop a new activity)
- Description of a personal learning goal (what the participant wishes to learn)

To be accepted as an associated member the proposals need to satisfy all three common ground competences of the Eurolecturer Academy presented in Figure 1.

A review board with reviewers (all of whom are full members of the Eurolecturer Academy) will evaluate the applications using a traffic light system and clearly defined criteria (rubric). The review board will approve new activities proposed by the new members.

Full Membership of the Eurolecturer Academy

An applicant who wants to become a full member of the Eurolecturer Academy has to already be an associated member. Applicants need to submit an application in which they describe:

- what they have realized in the Eurolecturer Academy (e.g., shared good practice or participated in organizing activities or developed new activities, etc.)
- what they have learned (which personal goal they reached and explain how this improved their teaching practice)
- Their reflection on three ELA common ground competences:
  - how they applied a European dimension in teaching and learning? How they collaborated with other lecturers in Europe?
  - how they practiced student centered learning?
  - how they practiced inclusive education?

A Review Committee composed of elected senior full members will evaluate the applications using transparent criteria presented in a rubric.

Sustainability of the Eurolecturer Academy

The basic structure that supports sustainability of the ELA is the "give and take" principle of membership. However, more is required. To make the Eurolecturer Academy sustainable, the following also needs to be done:

- Establishment of co-operation with existing bodies in higher Chemistry education on the national and European level to assure a growing of reputation and trust and to attract new members:
  - ECTN
  - EuChemS and National Chemical Societies
  - IUPAC
- Establishment of some co-operation with EUA and other higher education organisations, e.g. UNA Europa, Coimbra group, and LERU.
- Collaboration with the accreditation agency ASIIN to establish formal recognition of lecturers' competences based on micro-credentials
- Funds need to be guaranteed, coming from different sources: ELA membership, the issuance of the micro-credentials, registration fees for the STEM-CPD Summer School and other offerings. The existing bodies in higher Chemistry education and the European chemical and pharmaceutical industry will be approached to support organization of the STEM-CPD Summer School, sustainable development of the ELA micro-credentials catalogue and maintenance of online facilities. This will be elaborated in other documents.

Conclusions

There is a strong competition in scientific research at universities. The balance of priority of research vs. education lies strongly on the side of research. Teaching is undervalued and there is no system of recognition of teaching and learning competences at a European level. In Europe there is no common ground in the disciplinary or interdisciplinary continuous professional development of lecturers in teaching and learning. In this position paper we advocate the creation of an innovative, European state of the art higher education learning platform serving academics in their continuous professional development of teaching competences in their discipline and supporting academics in the professionalization of their learning in the changing world, the Eurolecturer Academy (ELA). We justify this need by providing five arguments: mobility, inclusivity, focus for disciplinary and interdisciplinary CPD, priorities and self-confidence, and recognition. It will be possible to become an associated member or a full member of the Eurolecturer Academy. The ELA will not only facilitate continuous professional development of university teaching staff, but will at the same time establish a structure that will support the recognition of teaching competences of lecturers and the European dimension in teaching and learning in higher education. The certification will profit from the new 5th European Qualification Framework for micro-credentials, providing a much needed "academic currency" for the purpose of recognition of academic credentials. The ELA will provide a micro-credentials catalogue that will follow the needs for the professional development of lecturers. It will ensure the quality of the micro-credentials through the collaboration of the ECTN with the internationally operating accreditation organization ASIIN in co-operation with the European Alliance for Subject-

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Specific and Professional Accreditation and Quality Assurance (EASPA) by using quality standards and valid assessment according to international best practice.

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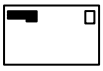
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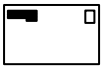
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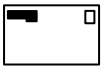
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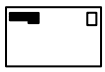 **Ştefania Grecea**
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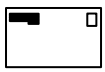 **Josefa Ortiz-Bustos**
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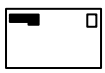 **William Byers**
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