

# Importance of contextualisation in developing university training: Professional Master's degree in "sustainable management of waste in an urban environment" in Algeria

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## Abstract

**Purpose of the study:** The goal is to emphasise the relevance of contextualisation in designing university professional training and adapting skills to the growth of social and labour market demands to maintain the University's long-term viability and resilience. It highlights the concepts and strategies used in building a professional master's degree in sustainable waste management in collaboration with the socio-economic and academic sectors (Rostock University, Germany).

**Methodology:** The method used is based on technical means: analysis of documents, investigation and observation in the field. Supplemented by the study of the work carried out by the professional in the situation, which lasted three years— complemented by a series of interviews with stakeholders in the waste management sector (academic and national and international socio-economic).

**Main findings:** Considering the context while developing the curriculum makes professional training a critical instrument for placing the University at the service of society.

The involvement of players in the socio-economic sector enhances the quality of higher education. Furthermore, it promotes the opening of the University to the socio-economic world and the integration of future executives into the industrial world.

**Applications of this study:** This study on the approach to adapting vocational courses to the local context in the waste management sector can be generalised to all areas where there is a need for the skills required.

The areas: we can mention operational town planning, the living environment and public space management, and heritage tourism development.

**Novelty/originality of this study:** The study's uniqueness stems from the strategy used in its conception and implementation, which included taking into account the local context, consulting and involving actors in the socio-economic sector, and establishing a collaboration platform, furthermore, within the university, the creation of an "Eco campus" pilot project as a field of practice, including students and professors as participants.

## INTRODUCTION

The university's first mission is to forge consciences, improve skills to their highest level of performance, and promote what is reliable and fair, social progress and economic development explain the former Algerian Minister of Higher Education (Bioud, 2016). Universities are among the different organisations tasked with creating a sustainable future (Wright and horst, 2013). By connecting research efforts and community needs, universities can facilitate progress to develop a more sustainable society (Alm et al., 2022).

Before higher education was based on the objective-based approach (AO) and has undergone many changes in the content of programs following numerous technological, environmental, societal and professional differences, These affect workplaces that are constantly changing, and this leads to a considerable adaptation of the University through new courses, particularly professionalising.

However, for about two decades, changes in higher education have particularly affected course curricula. Universities appear to be transitioning from a model centred on the transmission of academic information to one centred on their application to practical challenges. Due to the advent of the competency-based approach (APC) in the university environment, new educational methods have evolved, notably centred on professionalisation (CDD, 2011). Since the publication of the 2030 Agenda by the United Nations in 2016, the subject of sustainability has become increasingly important on a global scale (Boyon, 2019). Universities have shown increased interest in integrating sustainability into curricula (Alm et al., 2022).

To be resilient and sustainable, universities aim to place themselves at the service of society's progress and to make courses a fundamental tool at the service of these transformations and challenges, to align employment and skills with

the demands and needs of the economy, the aspirations of society and the labour market. University teachers are responsible for educating the future generation of leaders, decision-makers and decision-makers in sustainable development more than any other sector of society (Iqbal, Q. and Piwowar-Sulej, K.,2022).

First and foremost, the Algerian university, like most institutions throughout the globe, is undergoing a natural transformation due to the imperatives of knowledge globalisation and higher education reform (Benzine, 2016). On the other hand, the dysfunctions of the Algerian university system which have accumulated over the years and which have made it appear in specific sectors out of step with the profound changes that our country has experienced in the economic, technological, social, political and culture has committed the Algerian University to the implementation of a comprehensive and profound reform of higher education through the introduction in 2004 of the "LMD" reform utilising a "Skills-based approach", the revision of training curricula and the integration of the principles of sustainable development (MESRS, 2015). The 2015 action plan aims to introduce "new training methods based on new teaching paradigms, particularly the skills-based approach, by promoting self-training, tutoring, and immersion in the professional environment (MESRS, 2015).

However, despite these efforts, "the expected results remain, however, very mixed, mainly underlines the former Algerian Minister of Higher Education [...] in terms of the inadequacy of studies with the new economic environment and market needs" (Abdellatif, 2016). For these reasons, the challenge of involving the University in the technical support of investment projects, as well as its opening to its socio-economic environment through the development of its research potential and adaptation to the requirements of national and international competition, is highlighted in the Government's action plan (2021). (PAG, 2021). As part of this reflection, the interest is to examine this problem in waste management in Algeria.

In the waste sector, like most developing countries, Algeria faces serious environmental, social and economic challenges when it comes to managing its waste. Their management is one of the essential bets for urban communities. Regulatory, institutional and operational measures have been taken by the various sectors concerned. However, in practice and terms of the sustainability of investments, the efforts have not effectively achieved the objectives set. The various reports and studies highlight several failures in waste management and degradation in the living environment. A group of constraints are the origin of these failures, including the under-qualification of the personnel responsible for waste management and the lack of specialised skills (MEER, 2017 and GIZ, 2014), which raises the question of the responsibility of the University toward society.

In this perspective, the Constantine 3 University in Algeria marks its resilience through its commitment to providing sustainable professional training adapted to the Algerian context that meets the needs of the solid waste management sector in an urban environment. The interest of this article is to highlight the importance of taking charge of the local context in traineeship offers to meet the skills required in the waste sector. The result is to produce the first professional master's degree in sustainable waste management in an urban context. The collaboration between the national trash agency (AND), the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), and the University of Rostock.

Our purpose is to testify to this original and interdisciplinary experience by emphasising the points adopted in the organisation of teaching to put the University at the service of society. We want to show that the University must improve the potential for resilience and sustainability. It must be able to bounce back and rebuild itself in a growing socio-economic context through training offers that meet the new needs of society based on the principles of sustainable development.

## LITERATURE REVIEW

Each country has its own economic, environmental, social and technological context. The many changes that have characterised the latter have influenced the profiles of professions, making the integration of vocational courses into higher education, or "universalisation of vocational training," as Bourdoncle and Lessard put it, a necessity (2003). Traineeship appears to be a significant barrier between the professional and academic worlds. Interference between higher education and the evolution of society is inevitable. University educators are affected by this situation. Their profession leads them to accompany these changes (Olry and Gomet, 2011) by putting the University at the service of the progress of society through its evolution, its reform and the adaptation of courses to this changing context, which involves building resilience and sustainability of university education.

### The Evolution of Higher Education and the Emergence of Sustainability

Over the past two decades, in several countries worldwide, the university has undergone profound changes to respond to changing contexts, such as introducing the competency-based approach (Chauvigné and Coulet, 2010) and integrating sustainability into curricula. The latter (APC) designates an educational model that renovates and enhances university courses based on skills logic (UP, 2021). Teaching according to this approach prepares for a professional vocation and a vocation as a researcher (Ghouati, 2013). This reform was intended to respond to several challenges, including the professionalisation of studies to promote the socio-professional integration of graduates and conceived as an instrument at the same time to influence the university-enterprise relationship favourably.

Lozano et al., in their article titled "Connecting Competences and Pedagogical Approaches for Sustainable Development in Higher Education", point out that integrating sustainable development (SD) into higher education curricula and

curricula studies will also create meaningful SD learning outcomes (Lozano et al., cited by Alm et al., 2022). In addition to forming students and sustainability in higher education institutions (HEIs), universities play an essential role in achieving the SDGs (SDSN, 2020). They can facilitate progress by making studies a means to develop a more sustainable society by integrating sustainability awareness, skills and values into their professions.

This sense confirms Lison and Paquelin that the purpose of the evolution of the University, or higher education, is to promote the development of knowledge and skills to put them at the service of the individual and the community (2019). Lessard and Bourdoncle identify three stages in the evolution of the University:

- The University, which they describe as liberal, transmits knowledge in the service of truth;
- The research university to build knowledge in the service of science;
- The University of Service aims to put knowledge to good use in society (cited by Lison and Paquelin, 2019, p3). That demonstrates the University's commitment to integrating sustainable development goals into course design, emphasising the relevance of context analysis.

Universities have shown increased interest in integrating sustainability into curricula (Vallez et al., 2022). Some studies have sought to identify obstacles to implementing sustainable development in universities to incorporate sustainability into their programs and research groups (Filho et al., 2017; Chaleta et al., 2021, cited by Vallez, 2022). However, this article is a question of showing the importance of integrating the local context in the choice of professionalising university studies to meet the real needs (required skills) of society. It is a question of emphasising the role of the University and its Social Responsibility (Bokhari, 2017) as an institution responsible for creating a sustainable future (Wright and horst, 2013) and participating in the resolution of problems by forming skills appropriate to the situation. The central role of higher education and teachers in promoting sustainable development was addressed and identified in 1972 by the United Nations at the "United Nations Conference on the Human Environment and subsequently in many other conferences and documents officials (Voci and Karmasin, 2021). There is a growing awareness of the importance of sustainability, especially after publishing the 2030 Agenda in 2016 and its adoption within higher education institutions (Filho et al., certify (Martins et al. al., 2019).

Nowadays, universities should contribute to sustainable development through teaching students, pursuing sustainability, disseminating knowledge and integrating with industry (Bayuo et al., 2020; Cetindamar, 2016; Martins, 2019, cited by Iqbal et al., 2022) and also through the consideration of the context in the training offer. In the same vein, Meyer et al. that education is recognised as one of our best assets to achieve a society capable of existing in a state of sustainability (2016). Indeed, the role of higher education in achieving the 2030 Agenda is essential. As Mallow et al. point out in the IAU 2nd Global Survey Report on Higher Education and Research for Sustainable Development, the role of higher education is to educate future generations, lead research to find solutions to complex problems and supports local communities (2020). Universities can facilitate progress by linking research efforts and the community to develop a more sustainable society and a resilient and responsible university.

Resilience is a polysemous concept that today applies to territories without being specified or operational (Villar and David, 2014). Suppose resilience originally was used in physics and designated as the ability of a body to resist a shock nowadays. In that case, resilience is a concept that is part of the current concerns of researchers in the humanities, urban planning, geography, ecology, education, sociology and mental health. It refers to the ability to adapt to new situations. However, as Mestre points out, the concept of resilience has mainly been used in crises and sudden shocks. However, it is also relevant in the case of slow disturbances, when the resilient system shows its capacities for reorganisation and renewal (Gunderson and Holling, 2002, cited by Mestre, 2017), which is essential for sustainability. This is the case of context mutations which present themselves as slow disturbances that resilient systems must take care of. Norris and al. (2008) describe the resilience of a system as the capacity to modify itself rather than the capacity to maintain itself in a stable state. Resilience is a term considered for the ability to adapt, continue and renew (Norris and al. 2008, cited by Mestre, 2014). It will be a question of thinking resilience as an innovative adaptive dynamic process (Anaut, 2003), evolving towards a new state while preserving its functionalities (CERDD, 2021).

### **Contextualisation and identification of required skills**

Contextualisation considers the interaction between formation and its context in this article. It constitutes the stage of identification and analysis of the study's needs, which is regarded as the gap between current skills and those required to perform a task or achieve the desired result (CSMCD, 2002). This analysis makes it possible to find solutions to situations or solve problems "satisfactorily in a particular context by mobilising various capacities in an integrated manner" (Bellier, 1999, cited by Coulet, 2011).

In terms of education, the analysis of needs (required skills) provides a global vision of its contextualisation to ensure and develop a study plan consistent with real societal needs and invest in skills development. The reference to competencies for the organisation of curricula within higher education has become widespread in a few years. This recent and large-scale diffusion is undoubtedly related to the new mode of social regulation that constitutes higher education quality assurance. The extension of which is concurrent and notably carries this requirement. It is the hallmark of new educational policies, supported by UNESCO, the organisation for economic cooperation and development (OECD) and the States involved in the Bologna process, aimed at disseminating knowledge as a driving force for

economic and social development ([Chauvigné and Coulet, 2010](#)). Competence represents the objective sought through courses. It is a “polysemous term and can take on different meanings depending on the discipline” ([AG, 2015](#)). It is an integrated and functional set of knowledge, know-how, knowing how to be and knowing how to become, which will allow, in the face of a category of situations, to adapt, solve problems, and carry out projects. It combines knowledge, skills and behaviours appropriate to a given situation ([Coulet, 2011](#)). It is a comprehensive and functional collection of information, know-how, knowing how to be and how to become that will help you adapt, solve difficulties, and carry out projects in various scenarios. Professional competence consists of three intrinsically linked cognitive processes activated during the planning and execution of professional tasks.

In terms of sustainable development, some researchers identify a model based on five skills: the skill of systems thinking, which consists of analysing complex systems in different fields (society, environment, economy) in a local and global context. Anticipatory competence presents itself as an ability to analyse, assess sustainability issues and create creative and constructive skills ([Wiek et al., 2011](#)). Normative competence, strategic competence and interpersonal competence. Combining the five skills creates methods for developing curricula and course curricula to structure them most effectively according to the necessary learning outcomes of sustainability-related classes ([Alm et al., 2022](#)).

### Development of the curriculum

Its development was in parallel with the competency-based approach. It is defined “as an action plan inspired by the values that a society wishes to promote” ([Demeuse, 2013:1](#)). It is a synthetic document that designates “the design, organisation and programming of teaching/learning activities according to an educational path” ([Miled, 2005: 1](#)). It describes the objectives to be achieved, the content, the learning outcomes, the teaching methods and the evaluation processes, the activities and the learning approaches ([Demeuse, 2013](#)). It offers an overall, planned, structured and coherent vision of the pedagogical guidelines. It is a question of organising and managing to learn according to the expected results ([Demeuse, 2013](#); [Miled, 2005](#)). The curriculum is structured around six components ([Demeuse, 2013](#)):

- The lessons, the teaching strategies and the didactic processes to be implemented;
- Didactic materials
- The contents of the subjects,
- The expected results,
- The evaluation methods,
- Curriculum management methods.

The development of the curriculum constitutes an original work whose reflection requires the participation of all the actors concerned by the training (academic and socio-economic). Its development requires the identification of needs and the contextualisation of formation ([Miled, 2005](#)). It is inspired by the sum of reflections carried out on this object. [...]. It has its roots in the aims of the education system, in the history of the education system and the society under consideration; its contents depend on the particular needs to which it strives to respond effectively ([Demeuse, 2013](#)). It encompasses operational and pedagogical objectives defined by performance conditions and quality or level criteria ([Periti et al., 2012](#)) and impact objectives ([Le Boterf et al., 1992](#)). A purpose is the expected result described as incapacity or competence to achieve ([CEDIP, 2012](#)). The latter is based on in-depth knowledge of the study’s context. It outlines the factors to be considered, and the phases of analysis, planning and preparation of the courses. It thus determines the learning needs to be met and the preparatory activities to be carried out to ensure the quality of the teaching and its transferability in the development situation ([Teluq, 2014](#)).

### METHODOLOGY

This article focuses on putting the Algerian university at the service of the progress of society. It is a question of highlighting through the example of the professionalising Master's degree “sustainable management of waste in an urban environment” (G2DMU) created at the University of Constantine<sup>3</sup>, the importance of in-depth knowledge of the context in the design of university professional training and adapting required skills to changing societal and labour market needs. Therefore, identifying training needs for this training is a crucial phase. It measures the gap between the skills acquired and the skills required in waste management. A massive amount of work involved collaboration with a multidisciplinary team made up of teacher-researchers from the Institute of Management urban techniques, structured around identifying the state and the difficulties encountered in waste management; noted shortcomings in acquired skills dealing with waste management. The technical means used are documents, observation and field investigation. The documentary research consists of theoretical papers to understand the fundamental concepts of the research and the official reports produced by the various services in the waste sector, such as the Ministry of the Environment and Renewable Energies ([MEER, 2017](#)), the national waste agency ([AND, 2014](#)) and the German Algeria office ([GIZ, 2014](#)). In addition, observation and analysis of the work carried out by the professional in the situation. a thorough diagnosis accomplished based on a series of interviews with the responsible actors in the environment and waste management sectors, such as the environmental departments (DE), local authorities (APC) and technical landfill centre (CET) and specialised design offices. This work constructs on participation in study days organised by the socio-

economic sector on waste management and the living environment to discuss with the actors in the field, enrich our knowledge in this area, and target with them the skills required.

Documentary research on the 2003/2004 higher education reform (or the LMD reform), which aims to restructure and improve higher education in Algeria, and its 2015 action plan, the government action plan 2021 (PAG, 2021), and the Sustainable Development Goals (SDGs) to identify the university's societal responsibility. In addition to this local effort, execution of another project through interviews with foreign academic partners on the training curriculum (LMD).

Field research was done in several cities to get to know the waste management workforce of eastern Algeria (Constantine, Skikda, Jijel, kenchela and El Oued, Mila) at the level of environmental management (DE), local authorities (APC), and various public industrial entities of a commercial character (EPIC).

To constitute a knowledge base specific to the object of the study, a colossal work was done in collaboration with a multidisciplinary team made up of teacher-researchers from the institute of management of urban techniques, which lasted three years and is structured around several points, namely:

- Identification of the state and difficulties encountered in waste management in Algeria;
- Deficiencies noted in the skills acquired dealing with waste management;
- Identification of the skills required by the labour market in the field of waste management in Algeria;
- Identification of the objectives to be achieved,
- The new orientations of higher education and the professional perspectives of the Algerian market.

This database was built through documentary research, observation and analysis of the work carried out by the professional in the situation. It is accomplished through a thorough diagnosis based on interviews with responsible players in the environment and waste management sectors, such as environmental departments, local authorities and landfills. Techniques, specialised design offices, etc. This diagnosis is supplemented by the consultation of various documents and reports produced by the multiple services of the waste sector, such as the (MEER, 2017; AND, 2014; GIZ, 2014).

This work is also based on participation in study days organised by the socio-economic sector on waste management and the living environment to discuss with the actors in the field, enrich our knowledge in this area, and target with them the skills required. On the other hand, documentary research on the 2003/2004 higher education reform (or the LMD reform) which aims to restructure and improve higher education in Algeria and its 2015 action plan, the government action plan 2021 and the Sustainable Development Goals (SDGs) to be able to identify the University's responsibility to society.

In addition to this local work, another work was undertaken through interviews with partners from the international academic sector on the organisation of the training curriculum (LMD).

To identify the person in charge of waste management, a field survey was carried out in several cities of eastern Algeria (Constantine, Skikda, Jijel, kenchela and El Oued, Mila, etc.) at the level of the management of the environment (DE), local authorities (APC) and various public industrial establishments of a commercial nature (EPIC).

## RESULTS

### The context of this training

In-depth knowledge of the context is strongly recommended for the success and sustainability of formation projects. The context of this study concerns, on the one hand, the reform or the evolution of higher education in Algeria. On the other hand, the state and prospects of waste management are the fundamental elements.

### The evolution of the Algerian university system

The dysfunctions of the university system that have accumulated over the years have made the University appear out of step with the profound changes that the country has experienced on the economic, technological, social, political and cultural levels. These dysfunctions have made it necessary and urgent to bring the University out of the crisis it is going through by providing it with educational, scientific, human, material and structural resources that will allow it to meet the expectations of society while integrating into the international higher education system (Ghouati, 2013).

The management of these dysfunctions has committed the Algerian University to implement several comprehensive and profound reforms in the higher education system. The first stage is characterised by the gradual implementation of the notions of the "Algerianisation" of education since 1968. The second stage constitutes the first reform of the Higher Education system from 1971, and the third stage is summed up in the introduction of new pedagogical approaches responding to the economic demands of the Algerian market and interpreted in the law n°99-05 of April 04, 1999, bearing the orientation on higher education. The fourth step concerns introducing the LMD system following the European ECTS model applied following the Bologna Process in 1999 (Abdellatif, 2016).

The introduction of the "LMD" reform was made in 2004-2005 through a "Skills-based approach" that allowed the development of new university courses adapted to the requirements of globalisation. Training according to this approach

prepares for a professional vocation and a vocation as a researcher ([Ghouati, 2013](#)). This reform was intended to respond to several challenges, including the professionalisation of training to promote the socio-professional integration of graduates, conceived as an instrument at the same time to influence the university-enterprise relationship favourably. This approach (APC) designates a pedagogical model to renovate and enhance university education based on skills logic ([UP, 2021](#)).

In this same context, the 2015 action plan aims to introduce "new training methods based on new teaching paradigms, particularly the skills-based approach, by promoting self-traineeship, tutoring and professional immersion ([MESRS, 2015](#)). The actions retained in this plan are divided into ten (10) objectives aimed at deepening the reform, among which we highlight:

- Ensure quality training for better professional integration,
- The readability of diplomas and recognition by the labour market;
- Reinforcement of pedagogical supervision;
- Strengthening the relationship between higher education and the socio-economic sector;
- The international visibility of the education and research system and the development of the communication function within the institutions;
- The modernisation of university governance and implementation of quality assurance.

The 2004 reform allowed the development of new university courses, but the majority are not contextualised and do not meet the demands of Algerian society. In this sense, the former Algerian Minister of Higher Education emphasises that integrating innovative training courses is unsuited to the new economic environment and the market's needs. Some obsolete methods and mismatch between academic training and scientific reality required by the knowledge economy, a weapon of the 21st century, generate inefficient graduates, even incompetent for employment, as well as the absence of the international dimension of the curricula offered, hinders student mobility and constitutes a pitfall for the various partnership agreements ([Biod, 2013](#)). These are among the reasons for unemployment and underemployment of higher education graduates, estimated at 17.7% in 2016 ([ONS](#)). Adding to this is the lack of formal relations between universities and companies ([OIT, 2018](#)) and the lack of involvement of the national private sector in the governance bodies of higher education institutions. To this end, the Algerian government established another action plan in 2021. Three main sets of challenges structure its objectives:

- Quality in the fields of higher education,
- Scientific research,
- Innovation and governance, that of
- The employability and professional integration of graduates,
- Taking charge of university institutions' social and societal mission as local and global socio-economic development operators.

### **State and outlook for waste management in Algeria**

The second part of the course's context concerns the actual state of waste management in Algeria, its obstacles, and its prospects to identify the skills required to ensure sustainable waste management, the emergence of the circular economy, and the professional integration of future executives. Waste management in Algeria is considered one of the three priorities for improving citizens' living conditions and environment, currently representing a constitutional right. The critical situation reached in terms of the environment, hygiene and public sanitation has deteriorated sharply, which has prompted the State to adopt the National Strategy for the Environment (SNE) in various sectors. The waste management policy, which is part of the National Environmental Strategy, as well as the National Plan for Environmental Actions and Sustainable Development (PNAE-DD), has taken concrete form through the promulgation of Law 01-19 of 12 December 2001 relating to the management, control and disposal of waste ([MEER, 2017](#)).

In collaboration with the various sectors concerned, the Ministry responsible for the environment has implemented regulatory, institutional and operational measures to ensure effective and rational waste management. Nevertheless, and in terms of the fundamental sustainability of the investments, the efforts made have not effectively achieved the objectives set out beforehand. Waste treatment reveals that it is far from being effective. Of the 13,39 million tonnes of AMD produced in 2019, composting is marginal (1%), recycling is minimal (around 7% to 10%), and underdeveloped recovery. This large quantity of unrecovered waste represents an estimated market value of 40 billion Algerian dinars (Da) and can create 100,000 jobs, including 40,000 direct jobs. While "The recovery of all the recyclable waste generated in Algeria represents a potential economic gain of around 78,4 billion DA ([AND, 2020](#)). The various studies highlight several constraints, including the inadequacy of the existing resources to cope with the growing quantities of waste produced (Table 1), the under-qualification and lack of staff supervision at the level of the municipalities, the EPICs of collection or the EPICs of the CET and at the level of the wilaya's environmental directorates Without

forgetting the marginal role of the private sector in the management of household and similar waste and the limit to information in awareness-raising activities (MATE, 2011 et MEER, 2017).

**Table 1:** Evolution of the population and waste (DMA) From 2011 to 2019

Année	2011	2014	2016	2019
Population Mh	36.3	39.1	39.6	43.424
DMA/ MT	3.9	11	11.6	13,39

**Source:** based on [ONS](#) and [AND](#) data

A field survey carried out in several cities in eastern Algeria confirmed the total absence of specialists in waste management within these establishments and that waste management is mainly provided by non-specialists (engineers and technicians of the environment and sometimes are the heads of parks of the APC) which underlines that the management of urban waste in Algeria shows that it is far from being effective, as highlighted by the former Director-General of the Environment and Sustainable Development “the management of household waste is in deficit”. Despite the efforts, local authorities still experience many difficulties collecting, transporting, and processing this waste. In this perspective, the majority of studies and reports ([GIZ, 2014](#) and [MEER, 2017](#)) recommend developing human and technical skills at the central and local levels to:

- Professionalize waste management,
- Develop new technologies for the collection, treatment and recovery of waste,
- Implement composting and recycling plans and develop governance.

#### Principle of organisation of the “G2DMU” training curriculum

Thanks to the skills-based approach, the “G2DMU” Master is at the interface between waste management engineering, human sciences, environmental strategies, and higher education.

The principle of an organisation (figure 1) is based on a few points which seemed very important to us:

- Make the relationship between academic knowledge and professional practices functional,
- Reconcile training, the responsibility of the University and the needs of society,
- The involvement of actors from the socio-economic sector upstream and downstream in this training project,
- Development of partnerships with the academic and socio-economic sectors (national and international),
- The program is based on the alternation of Theoretical and practical lessons, of which the volume of practice (TP, Workshop and Internships in companies represents more than 60%),
- Training of trainers and identification of didactic and pedagogical materials,
- Initiation of an Eco campus pilot project to support training.



**Figure 1:** Training organization

## A Master's based on national and international partnership

The waste sector and the improvement of the quality of life constitute a priority area of work for the Algerian authorities, aware that the activity of waste management (collection, sorting and recycling) conceals numerous socio-economic opportunities and should be transformed into an economic sector that generates wealth, provide employment and protects the environment. The contribution of the University Constantine 3 to the achievement of these objectives focuses on the creation of the professionalising Master's degree in "sustainable management of waste in an urban environment" in 2017 at the level of the Institute for the Management of Urban Techniques (IGTU) in partnership within with (GIZ), (AND), the University of Rostock (Germany) and the Algerian socio-economic sector (figure 2).

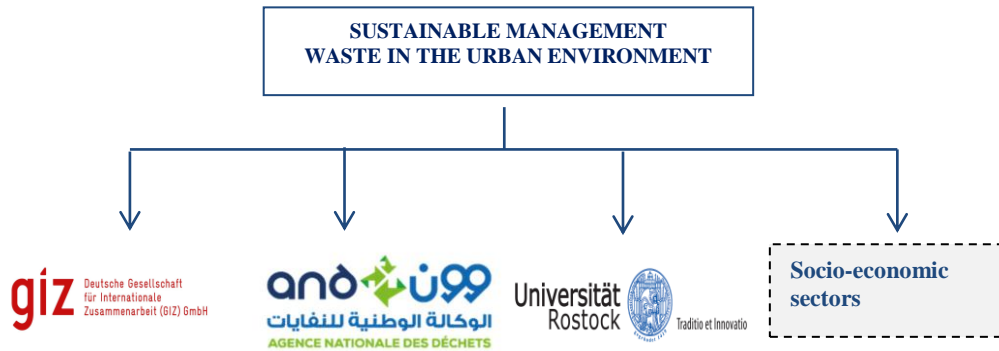


Figure 2: Training partners

Source: [Bouadam, 2020](#)

### Objectives and skills targeted by the Master

This Master's degree (G2DMU) is training with a strong professional orientation. He aims to train skills adapted to the Algerian context in waste management and improve the living environment to make them available to the socio-economic and industrial sectors. It aims to train high-level professionals who know how to mobilise and operationalise their knowledge, articulating situation analyses, decision-making, and developing innovative projects favouring sustainable waste management while taking social aspects into account.

Technical, economic and environmental situations to be resolved, with the constant concern to assess the relevance and quality of the action taken. At the end of this training, managers will be able to:

- Organize pre-collection and collection;
- Develop optimised waste collection and transport circuits;
- Master communication and awareness tools;
- The emergence of the circular economy through the creation and setting up of specialised micro-enterprises (start-ups) in waste management;
- Recovery of organic and green waste by the technique of composting;
- Carrying out characterisation campaigns for household waste.

### The involvement of the socio-economic sector

The critical element in the organisation of this training is the involvement of actors from the socio-economic sector upstream and downstream of the training. This involvement is framed by conventions and is achieved through:

- Participation in teaching and training of trainers,
- The support of training by conferences to complete and reinforce the courses;
- Reception of students during internships (integration, qualification and end of studies);
- Co-supervision of students during internships (integration, qualification and end of studies);
- The animation of educational seminars;
- Participation in scientific events,

### Establishment of a cooperation platform

As it is a professionalising Master, the Operational component remains the key to the success of the training. We have prepared a cooperation platform with the socio-economic sector specialising in the environment and waste management field. We have designed a cooperation platform framed by agreements with the socio-economic industry specialising in the background and waste management field. A series of discussions were carried out with the sector actors on the



possibility and the form of their contributions to this training to functional the relationship between theoretical knowledge (academic given in class) and professional practices (during the internships).

After two successive years of work and contact, we were able to develop agreements between Constantine 3 University (UC3) and several partners in the national sector, such as:

- The national waste agency (AND),
- The environmental departments of certain cities,
- Technical landfill centres (CET),
- Waste management establishments (public and private),
- Local communities,
- Design offices specialising in the field of the environment and waste management,
- Associations in the field of the environment and urban quality,
- Research laboratories in the field,

### Training of trainers

As part of this training and to ensure a good level for future managers, we have based ourselves on the exercise of trainers. A series of training sessions has been programmed with the professional sector (GIZ, environmental department, specialist consultancy, etc.), organisations for integrating young people into professional life, the academic sector (University of Rostock), and other organisations.

### Didactic and educational materials

Several educational resources have been put in place to ensure quality training, particularly creating an academic laboratory within the institute to manage urban techniques.

## DISCUSSION

Universities play an essential role in shaping the future of global society in terms of sustainable development by generating new knowledge and contributing to the development of skills appropriate to the context ([Rieckmann, 2012](#)).

This study shows that, given the crucial role of the University (institution of higher education) in the transition towards a more sustainable society, the consideration of the context in the offer and design of training is highly recommended. It is a question of strengthening the responsibility of the University towards society through the formation of skills which must meet the actual demands of society.

The analysis of the context brought out three vital points:

The first concerns higher education, which is characterised by the inadequacy of training for the needs of society. The quality of university training in Algeria remains punctuated by shortcomings and failures, which makes the professional integration of graduates somewhat little fiery. The problem students face today at the university level is that teaching is based much more on the theoretical aspect, to the detriment of practice.

The second point concerns the field of this Master's, waste management. The study showed a total lack of skills. According to the National Strategy for Integrated Waste Management (SNGID) forecasts, in 2035, the Algerian population will reach 54.5 million, and the production of AMD will reach 17.9 million tonnes. This strategy targets a zero-waste society, developing a circular economy and the green economy (Table 2). This strategy highlights specific opportunities, including recycling which will rise from 7% to 25% and composting from 1% to 50%. The public/private partnership's growth potential could mobilise new resources ([MEER, 2017](#)).

How do we concretise these forecasts if the state does not have skills?

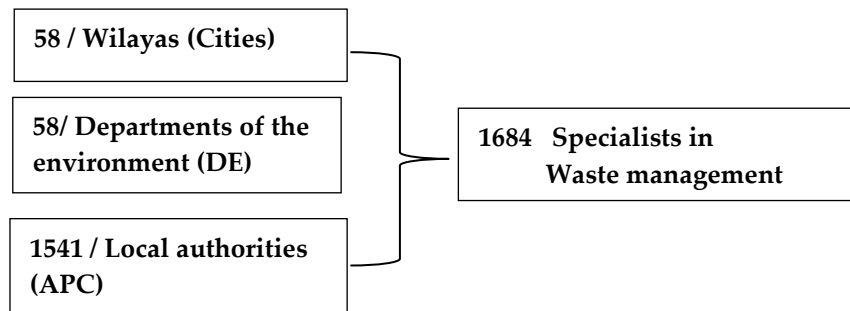
**Table 2:** Prospects for waste management 2018 2035

	2018	2035
<b>Habitant/ Millions</b>	42.22	54,5
<b>DMA / Millions de tonnes</b>	13	17,9
<b>Taux de Collecte</b>	70% - 80%	100%
<b>Composting</b>	1 %	50%
<b>Recyclage</b>	Seven à 10%	25%

**Source:** based on data from [MEER, 2017](#)

The third point concerns the minimum skill requirement. In the field survey, we took only take the seats of the 58 cities of the Algerian national territory with their environmental departments and the 1541 municipalities that make up the national territory; the need for skills in waste management at the rate of one manager / per establishment is

approximately 1684 managers (figure 3). This figure did not take into consideration the private sector. As such, the professionalisation of the waste sector becomes highly recommended. This confirms the real need and importance of such training in Algeria. This situation calls for and amply justifies recourse to the exercise of executives who will be a support to the regional and national administrations.



**Figure 3:** Skills needed in the prominent institutions

**Source :** Author

This situation calls for and amply justifies recourse to the forming of executives who will be a support to the regional and national administrations. To this end, and given the various changes that have marked the country and which have impacted the profiles of the professions, the integration of vocational courses in higher education or "The universalisation of vocational courses", according to the expression used by [Bourdoncle & Lessard](#) becomes a necessity (2003). It is clear that the world urgently needs skilled professionals to contribute to societal transformations toward sustainability ([Gordon et al., 2019, cited by Redman et al., 2021](#)).

In the Algerian context and response to this challenge, the contribution of the University of Constantine<sup>3</sup> focused on the creation of the professionalising Master's degree in "sustainable management of waste in an urban environment" based on the principle of partnership with the academic sector and industry and this to offer quality study and ensure the openness of the University to its environment. The latter aims to build skills adapted to the Algerian context in waste management and improve the living environment to make them available to the socio-economic and industrial sectors. It aims to train high-level professionals who know how to mobilise and operationalise their knowledge, articulating situation analyses, decision-making, and developing innovative projects favouring sustainable waste management while taking social aspects into account. Technical, economic and environmental situations to be resolved, with the constant concern to assess the relevance and quality of the action taken. The context analysis allowed us to describe the factors to be taken into account in the design and the phases of the research, planning and preparation of the courses and the determination of the learning needs and the preparatory activities to ensure the quality of learning ([Teluq, 2014](#)). [Rieckmann \(2012\)](#) argues that developing mastery of critical skills enables people to participate actively and responsibly in modern society.

### **A pilot project to support eco-campus training**

Improving the consideration of environmental aspects and implementing the sustainable development policy within the University Constantine 3 is a fundamental element of its strategy.

University programs and sustainability researchers are investigating how best to prepare students to integrate sustainability into future professional endeavours ([Junghanns & Beery, 2020, cited by Am et al., 2022](#)). educational institutions should prepare students for these roles ([Barth, 2016; Franco et al., 2019, cited by Redman et al., 2021](#)).

Given the crucial role of the University (institution of higher education) in the transition to a more sustainable society and in preparing students for integration into professional life, a pilot project was initiated in 2017 to accompany the study ([Bouadam, 2020b](#)). The latter was adopted in the establishment plan of UC3. This project is an opportunity to integrate sustainable development into the University's strategy. It aims to insert the UC3 university campus into an Eco Campus dynamic and combine teaching and practice to prepare future executives for their integration into professional life. It is considered a support project for professional education "G2DMU", one of whose axes is the management of waste generated by the campus, which constitutes a step towards the transition of the University into an Eco campus and the emergence circular economy ([Bouadam, 2020b](#)).

The actions of the project are directly related to the program in its practical componentthe ; first phase of the eco-Campus project of UC3 focuses on the management of waste generated by the latter (collection and transport, characterisation, sorting and awareness) to move on to the emergence of the circular economy. The actors of this project are teachers and students (master and doctoral students) ([Bouadam, 2021](#)).

### **CONCLUSION**

Given the current changing context and the crucial role of higher education institutions in the transition to a more sustainable society, the interest of this research is to emphasise the importance of taking into account the context in the

offer and design of courses. It is a question of underlining that the University has a responsibility towards society through the studies offered that must meet society's actual needs. The University must be able to bounce back and rebuild itself in a growing socio-economic context through formation, design method, its relationship with the socio-economic sector and the integration of the principles of sustainable development. University instructors are called upon to support these changes.

In Algeria, the problem of urban waste management is still acute. The public authorities, aware of this situation, have shown their willingness to provide the country with a sound and efficient management system by implementing programs and plans. However, this objective can only be achieved effectively if it is accompanied by the training of specialists who will implement these programs and be supported by research. It is essential to link research efforts, and community needs to develop a more sustainable society.

The opening of the University to the socio-economic sector, the development of a partnership platform framed by agreements and its involvement in the process of design and professional education (teaching and supervision) prove to be essential for the sustainability of formation, termination of University and the easy integration of future executives into the world of work.

Through the experience of developing the first professionalising master's degree in waste management in an urban environment at the University of Constantine3 (Algeria), we have tried to highlight the strengths of the approach followed in the design and implemented for use and improvement.

### LIMITATIONS AND SUGGESTIONS

This research on tailoring professional courses to the local environment in the waste management industry can be applied to any field where the requisite skills are required. Similarly, consultation and participation of socioeconomic players and creating a collaboration platform are critical for the success and long-term sustainability of training.

### CONFLICT OF INTEREST AND ETHICAL STANDARDS

The Author confirms no conflicts of interest with the current organisation and no unethical practices followed during the study.

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