

Recycling behaviour in higher education institutions: a systematic literature review

Received
15th November 2019

Revised
11th December 2019

Accepted
28th January 2020

Rezarta Sallaku - Rossella Baratta - Angelo Bonfanti
Vania Vigolo

Abstract

Purpose of the paper: *This paper aims to provide a systematic literature review on recycling behaviours in higher education institutions to gather and synthesise the extant knowledge on this topic into a comprehensive framework, in line with the premise that colleges and universities have the moral responsibility to educate people for a better and more sustainable future. More specifically, this study provides a basic understanding of the research topic and identifies the factors affecting recycling intentions/behaviours in higher education institutions.*

Methodology: *A systematic literature review of existing research is conducted. A total of 64 journal articles published between 1995 and 2019 are analysed in five steps: obtaining a basic understanding, coding, categorisation, comparison and further analysis.*

Findings: *This study identifies environmental concern, attitudes towards recycling, social norms, university environmental policy and availability of recycling facilities at higher education institutions as the factors affecting recycling intentions/behaviours in higher education institutions.*

Theoretical and practical implications: *Scholars could use this paper as a reference to systematise knowledge on recycling behaviour in the higher education context and further advance knowledge on this topic by identifying specific research areas that could be theoretically and empirically investigated. University managers could use the findings of this study as a basis for designing behavioural intervention programs in their institutions.*

Originality of the paper: *Previous research focuses on recycling in the home or workplace environments. No systematic literature review on recycling behaviours in the higher education setting has previously been undertaken, despite the key role universities play in increasing awareness of environmental issues.*

Key words: sustainability; students; university policy; environmental awareness and concern; attitude towards recycling; social norms

1. Introduction

Public debate regarding how to reduce the waste problem for the conservation of natural resources is becoming more and more intense. A general awareness of the environmental consequences of waste is evident, and is also reflected in the legislative environment. Recycling is commonly referred to as a preferred method of waste reduction (Virtanen

and Nilsson, 2013). Generally, there is an increasing awareness of the environmental impact of consumer behaviour (Oguz *et al.*, 2010) and the importance of recycling as an effective resource-recovery mechanism in relation to economic and environmental benefits. Accordingly, a number of marketing scholars and specialists are seeking to better understand these pro-environmental behaviours in different analysis contexts. For example, Varotto and Spagnolli (2017) conducted a systematic literature review, focusing exclusively on recycling in the home environment. Further, regarding pro-environmental behaviours in the workplace, Yuriev *et al.* (2018) analysed the barriers to recycling behaviour, while Inoue and Alfaro-Barrantes (2015) identified the determinant factors.

At the best of our knowledge, however, no systematic literature review about recycling behaviours has been conducted in the context of higher education institutions, despite their key role in promoting environmental awareness and sustainability related issues. Higher education institutions such as universities have a moral responsibility to contribute to sustainability (Cortese, 1992), which is only stronger if they aim to achieve sustainable resource use as part of their corporate mission. Teaching and increasing awareness of sustainability issues represent a fundamental part of universities' larger mission to educate people for a better future (Meyer, 2016). Moreover, universities are also considered well suited to finding solutions to problems threatening society (Kaplowitz *et al.*, 2009).

In light of this, universities have recently started to pay increasing attention to improving environmental policies and on-campus recycling facilities (e.g. Wan *et al.*, 2012; Izagirre-Olaizola *et al.*, 2015). A number of green activities are being undertaken to respond to the rapid increase of student, staff and support infrastructure numbers, which requires significant resources, such as energy and paper (e.g. Marcell *et al.*, 2004; Amutenya *et al.*, 2009; Altan, 2010; Mtutu and Thondhlana, 2016). As scholars have argued, universities can be considered communities that significantly influence wider society, and can, consequently, lead the implementation of sustainability-related initiatives (Kaplowitz *et al.*, 2009) and maintain pro-environmental behaviours (Kelly *et al.*, 2006).

With specific reference to studies on recycling—a key strategy to develop a sustainable university campus (e.g. Smyth *et al.*, 2010) - there is a need to improve understanding of recycling behaviours, because successful recycling programs demand both technology and the involvement of people (Kelly *et al.*, 2006). To the best of our knowledge, recycling behaviours have been explored in fragmented way in the “business management and accounting” research subject area included in the Scopus database. More precisely, previous research has fundamentally examined this topic with reference to specific countries or universities; each of these studies highlighted results deriving from surveys carried out in such contexts. Accordingly, there is a lack of a holistic vision on this topic to try to predict recycling behaviour.

By systematically reviewing previous journal articles, this study seeks to gather and synthesise the extant knowledge on recycling behaviours in the higher education context into a comprehensive framework. In this regard, after providing a basic understanding of the research topic, the factors

affecting recycling intentions/behaviours in higher education institutions are identified. Finally, future research directions are proposed.

The findings of this systematic literature review contribute theoretically and practically. They enable scholars to not only systematise knowledge on recycling behaviour in the higher education context but also further advance knowledge on this topic by identifying specific research areas that could be theoretically and empirically investigated. In addition, the results have managerial implications for supporting the adoption of more sustainable behaviours and suggest that university managers use the identified factors affecting recycling intentions/behaviours as a basis for designing behavioural intervention programs in their higher education institutions.

The remainder of the paper is structured as follows. The next section describes the methodology employed in the study, explaining how the materials were collected, selected and analysed. Following this, the descriptive results of the analysis are presented (year of publication, journal and research method) and factors that affect recycling intentions/behaviours in higher education institutions are proposed. Subsequently, directions for future studies on recycling behaviours are considered. Finally, the study concludes by underlining some limitations.

Rezarta Sallaku
Rossella Baratta
Angelo Bonfanti
Vanja Vigolo
Recycling behaviour
in higher education
institutions: a systematic
literature review

2. Methodology

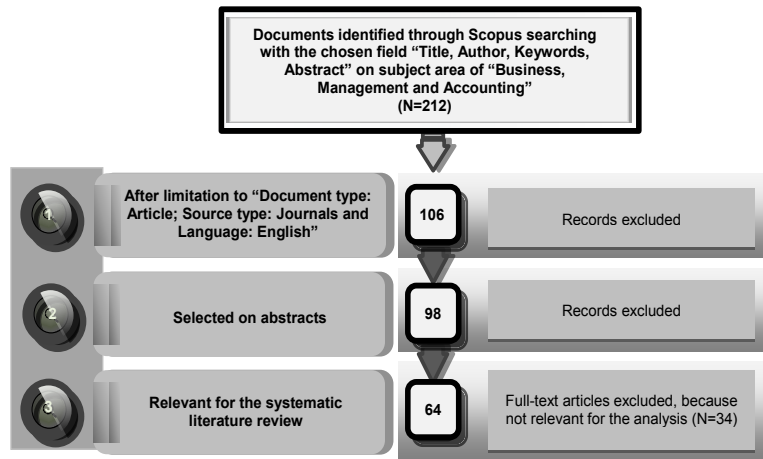
This study employs a systematic literature review as its methodological approach. This specific method, which provides a transparent and dependable evaluation of the topic under examination, enables a researcher to address new or emerging topics, monitor progress in a research field, promote knowledge building, understand a phenomenon and clarify unexplored research topics (e.g. Booth *et al.*, 2012; Lightfoot *et al.*, 2013). This review adopted the following four steps proposed by Denyer and Tranfield (2009) and Merli *et al.* (2018): a) formulation and definition of clear research questions and keywords, b) definition of inclusion criteria, c) selection and evaluation of materials and d) analysis and synthesis of the selected material.

Articles on recycling behaviour in higher education institutions were selected from the Scopus database, defined by Merli *et al.* (2018) as one of the most authoritative and comprehensive databases covering scientific research, and the largest database of peer-reviewed literature in terms of number of abstracts (Jacsó, 2011). Searches were performed using the keywords “waste recycle*” OR “separate collection” OR “separate waste collection” OR “recycle*”, along with keywords that express the analysis setting (“campus” OR “university” OR “college” OR “higher education institutions”). Each search was carried out in the “Title, author, keywords, abstract” field. Although this topic has been analysed across different research subject areas, such as chemistry, medicine, engineering and psychology, the current paper focuses on the “business, management and accounting” subject area. The records identified through the Scopus search comprised 212 documents. After the first selection, the final sample

considered only articles published in academic journals and written only in English, since this is the accepted global language for research (Merli *et al.*, 2018). Consequently, one-half (106) of the 212 documents on recycling behaviours were removed.

After the selection and evaluation of materials, the remaining papers (n = 106) were analysed in more detail. The abstracts were scanned to keep the search process in line with the objectives of this study, and eight articles were excluded because they were not relevant for the analysis. After reading of full remaining articles (n = 98), another 34 articles were removed because they were not relevant for the study. The remaining 64 articles were selected for the systematic literature review, and moved to a single Excel sheet to aid analysis. Figure 1 provides an overview of the selection process.

Fig. 1: Selection process



Source: Our elaboration

To provide a basic understanding of the topic, articles were coded in relation to both publication trend per year and journal. Also, the distribution of selected papers was analysed in relation to article type (conceptual, empirical or general review) and research method (qualitative, quantitative or mixed).

To identify the factors affecting recycling intentions/behaviours in higher education institutions, a content analysis of the 64 articles was undertaken (Stemler, 2001). Thematic coding of this material was undertaken inductively (Saldana, 2009) in relation to the research purpose. The coding was conservative in approach, given that it included only what was explicit in the data; in other words, intentionality was not inferred in the data. The themes capturing factors influencing recycling behaviours were distinguished into the five following categories: a) environmental concern, b) attitudes towards recycling, c) social norms, d) university environmental policy and e) availability of recycling facilities at higher education institutions.

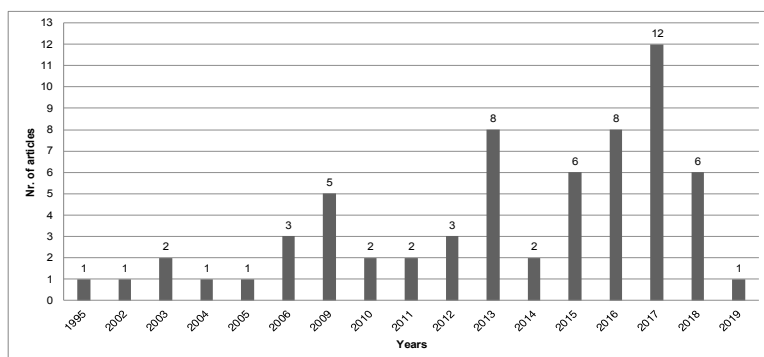
3. Findings

This section presents the descriptive findings. Section 3.1 describes the distribution of the publications over time and among journals, the type of article (conceptual, empirical or review) and the methodology adopted (qualitative, quantitative or mixed). After that, Section 3.2 presents the main factors affecting recycling behaviours in higher education institutions that emerged from the literature analysis.

3.1 A basic understanding of the research topic

The analysis of the selected papers revealed that the first study on recycling behaviours in higher education institutions dates to 1995 (Shim, 1995). The subsequent article identified in the data set under analysis was published only in 2002, suggesting limited academic interest in this field of research over the second half of the 1990s. In Figure 2, which presents the distribution of the articles over time, a sharp increase in publications can be observed for the period 2015-2018; about half (51.6%) of the selected papers were published in these four years. The most productive year for research on this topic was 2017, when 12 articles (18.8%) were published. In the first months of 2019, only one article was published.

Fig. 2: Distribution of publications on recycling in higher education institutions over time



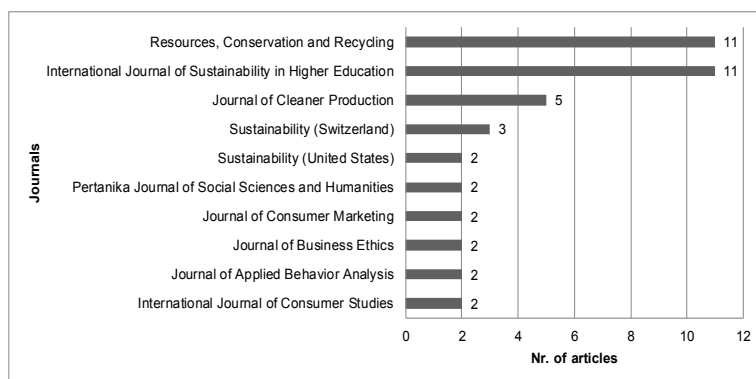
Source: Our elaboration

With regard to journal, the articles in the unit of analysis belong to a total of 32 different journals related to the “business, management and accounting” subject area, and more specifically, to marketing, consumer behaviour, environment and sustainability. Resources, Conservation and Recycling and International Journal of Sustainability in Higher Education had the highest number of published articles (11) on this topic. Figure 3 presents the journals with at least two published articles.

In terms of article type (conceptual, empirical or review), a lack of conceptual and review papers was identified; in fact, all the selected papers are empirical. From a methodological perspective, 17.5% of

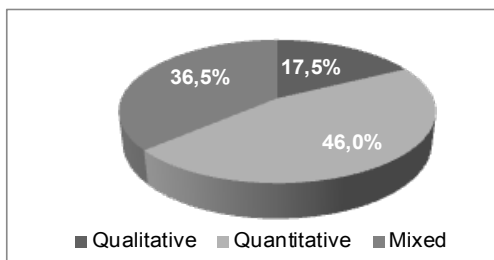
empirical studies adopt a qualitative approach, 46.0% adopt a quantitative approach and 36.5% use a mixed-method approach (both qualitative and quantitative methodologies). A relatively high percentage of the research adopted a mixed approach, combining both qualitative and quantitative methodologies, to better explain recycling behaviours in the university context (see Figure 4).

Fig. 3: Distribution of publications among journals (journals with at least two published articles)



Source: Our elaboration

Fig. 4: Distribution of publications based on research methodology



Source: Our elaboration

3.2 Factors affecting recycling intentions/behaviours in higher education institutions

Thematic analysis revealed five major factors affecting recycling intentions/behaviours in higher education institutions. Specifically, the following themes were identified: a) environmental concern, b) attitudes towards recycling, c) social norms, d) university environmental policy and e) availability of recycling facilities at higher education institutions. After presenting the results of the thematic analysis, socio-demographic characteristics associated with higher recycling rates are proposed.

A number of studies identified environmental concern as an important element in the development of a positive attitude towards recycling. This

theme includes a variety of more specific topics, such as environmental awareness, environmental knowledge and environmental values, as Table 1 shows. More precisely, awareness of environmental pollution was found to be a driver of college students' recycling behaviours in a study conducted at a Chinese university (Zhang *et al.*, 2017). Awareness of environmental consequences was also found to encourage eCycling (i.e. the recycling of electronic waste) among college students (Gonul *et al.*, 2016), and to be important in improving academic and non-academic staff recycling rates (Aksan and Çelikler, 2017; Davis *et al.*, 2009). In a cross-country comparative analysis, Izagirre-Olaizola *et al.* (2015) showed that environmental knowledge is a useful factor for predicting university students' recycling behaviours. In terms of electronic waste, environmental concern motivates students to use a specific recycling bin (Jiménez-Parra *et al.*, 2014). Eco-concern favours pro-environmental behaviours of college students while traveling (Han and Hyun, 2018). Joung and Park-Poaps (2013) conducted an empirical analysis at a south-eastern US university and found that environmental concern influences the resale and the donation of clothes by students. In another study to test whether university students were likely to reduce their on-campus waste stream, Flagg and Bates (2016) found that environmental values were associated with self-reporting higher levels of recycling effort. In a recent study by Felix and Almaguer (2019) conducted with college students, a feeling of psychological ownership of "planet earth" was positively associated with both recycling and green purchasing. In a study to explore the connections students make between their food-related choices and the environment and the actions that can be undertaken to ameliorate negative environmental outcomes associated with modern food practices, having a pro-environmental worldview was associated with recycling and reducing food waste (Campbell-Arvai, 2015). Environmental awareness, however, may not be enough, and other studies show that even if university students are aware of the importance of recycling, their attitudes and behaviours conflict with this (Basri *et al.*, 2016). In a study to explore students' assessment of campus sustainability components, it was found that even if students indicate environmental awareness and concern, they lack willingness to participate in environmental initiatives (Abubakar *et al.*, 2016). In an empirical analysis conducted at Oxford, it emerged that such students do not have a high level of recycling (Robertson and Walkington, 2009). Also, in the context of textiles, materialistic customers who consider clothes a symbol of prestige, success and social status (Browne and Kaldenberg, 1997) were not interested in environmental issues, but their participation in recycling was the same as non-materialistic customers. In this respect, a group of college students was compared with non-students in terms of recycling and environmental awareness, with no differences able to be verified between the two groups (Vitell and Muncy, 2005). Thematic analysis also revealed that a lack of or a low environmental awareness has a negative relationship with recycling in higher education institutions. In a study to develop a checklist to examine the green culinary behaviours of hospitality students, Wang (2016) found that many students engage in non-green behaviours (i.e. kitchen waste), mainly because of low environmental awareness.

Another paper found that university students have only moderate environmental awareness and therefore only sometimes practice recycling (Omran *et al.*, 2017). Alves and Farina (2018), in a study to identify factors that influence e-waste management at a Brazilian university, affirmed that more environmental awareness is needed. Kaplowitz *et al.* (2009) reported that the lack of knowledge about the environmental benefits that derive from recycling has a negative influence on proper recycling. The lack of knowledge about the consequences on the environment also negatively influences recycling behaviours of the non-academic staff of a university (Davis *et al.*, 2009).

The second theme that emerged from the analysis includes attitude towards recycling. In an empirical study to examine the antecedents of proper disposal of used batteries at a university campus, Apinapath *et al.* (2015) found that a positive attitude towards recycling is a relevant predictor of students' recycling intentions. Positive attitudes towards recycling also affect recycling of electronic waste among college students (Gonul *et al.*, 2016) and favour pro-environmental behaviours of college students while traveling (Han and Hyun, 2018). In a field experiment conducted at a university, positive attitudes towards the environment were found to facilitate the implementation of an accounting model to monitor waste production (Gallo *et al.*, 2017). However, in contrast with previous studies, Joung (2013) found that positive environmental attitudes do not positively affect participation in recycling.

The third theme that emerged from the analysis of the factors affecting recycling intentions/behaviours is represented by social norms, understood as the external influence students are exposed to. Social norms, in the sense of "the perceived social pressure to perform or not to perform the behavior" (Ajzen, 1991, p. 188), are associated with pro-environmental behaviours of college students while traveling (Han and Hyun, 2018). In a study on the use of e-learning platforms in embedding sustainability concepts in higher education, Sanganyado and Nkomo (2018) found that e-learning activities and discussions promoted chemistry and engineering students' engagement in sustainability, because they could learn about their peers' sustainable practices. Apinapath *et al.* (2015) also found that exposure to environmental information from professors and peers is a relevant predictor of students' recycling intentions. Family members, parents and friends positively influence the recycling behaviours of students (Robertson and Walkington, 2009). The positive influence of surrounding friends as an antecedent of students' recycling behaviours is also reported by Zhang *et al.* (2017). Moreover, students are motivated by family norms to resell and donate their clothes (Joung and Park-Poaps 2013).

The fourth theme that emerged from the analysis, university environmental policy, includes, for example, the organisation of projects, initiatives or academic courses related to environmental issues. To involve more students in recycling, universities may promote recycling activities encouraging students to participate. Being part of such projects, student will better understand the importance of recycling and how to correctly recycle (De Vega *et al.*, 2003; Mason *et al.*, 2004; Smyth *et al.*, 2010; Kurland, 2011; Baldwin and Dripps, 2012; Zain *et al.*, 2012; Barros *et al.*,

2013; Cole and Fieselman, 2013; Posey and Webster, 2013; Zain *et al.*, 2013; Becker *et al.*, 2014). Recycling programs that explain clearly what, how and where to recycle, and do not solely focus on why to recycle, motivate students to become good recyclers (Kaplowitz *et al.*, 2009). The green building initiative at the College of Charleston, in South Carolina, US changed the recycling behaviour of students as it provided additional information about recycling rules (Owens and Halfacre-Hitchcock, 2006). In a case study at a Brazilian university to discuss the implementation of a waste management plan, Fagnani and Guimarães (2017) found that percentages of waste were significantly lower after the implementation of the plan, and even lower after students and staff were involved in a waste minimisation awareness campaign. Maldonado (2006) showed quantitatively that participation in a program for the minimisation and recycling of solid waste not only enhanced environmental awareness but also significantly reduced (by around two-thirds) the amount of waste. Another study, performed at a leading US university for green initiatives, showed that the level of students' sustainable practices is higher if they have taken academic courses related to environmental sustainability (Choi *et al.*, 2017). As De Vega *et al.* (2003) noted for the case of Mexico, a lack of environmental education negatively influences the active participation of students in recycling. In a study to identify best practices for successful sustainability programs at different universities, Tahara *et al.* (2015) found that educational efforts, a full-time sustainability coordinator as well as student volunteers were among the core elements of successful programs. In a survey of university staff, Brennan *et al.* (2015) showed that action plans and staff training can improve sustainability implementation in university operations. Training teachers was also found to improve e-waste recycling rates (Bitanga, 2017). In university contexts, where the level of paper usage is very high, a small reduction of paper used will significantly reduce the waste stream. For example, replacement with double-sided printers reduces by half the total amount of paper used. In this way, through different opportunities to access new sustainable technologies and programs, university members are encouraged to recycle and, at the same time, improve their recycling behaviour (Amutenya *et al.*, 2009). At Swansea University, UK, an experiment was conducted that made reusable cups available at a discounted price. The main objective was to analyse staff and student attitudes towards such a new option. The results indicated that such "financial incentives" increased the rate of university members using refillable mugs (Harris and Probert, 2009). Technology can also be considered a tool to address sustainability issues, as in the study conducted by Mozo-Reyes *et al.* (2016), where the implementation of technological bins at a university produced an increase in recycling through interactivity and feedback that made recycling more attractive to students. However, despite these studies showing that environmental education reduces the waste stream, the results of an experiment organised by professors at a US university demonstrated that the presence of recycling education does not increase recycling in students' apartments (Pike *et al.*, 2003).

The last theme that emerged from the analysis concerns the quality of recycling facilities provided at the university. With regard to this topic, two

specific issues emerged: the availability of recycling bins and the availability of information and guidelines on how to correctly use them. Related issues of time constraints and effort constraints also emerged. As an example, a lack of bins represents a circumstantial limitation to the proper disposal of used batteries among college students (Apinpath *et al.*, 2015), and a lack of recycling bins for electronic waste does not permit students to recycle such waste (Leodir Löbler *et al.*, 2012). Quality issues regarding recycling facilities may consist not only of a lack of bins but also the wrong positioning of bins, as demonstrated by a behavioural study in which a significant increase in recycling was reported with centrally located recycling bins (Binder *et al.*, 2017). In a study on strategies to enhance waste management activities at university campuses, Ebrahimi and North (2017) reported that identifying new locations for bins may be an effective strategy since the lack of access to a sufficient number of bins in university campuses represents one of the main barriers to recycling. Another study showed that if recycling bins are placed in classrooms or other common places, the level of recycling increases (O'Connor *et al.*, 2010). Similar results are provided by a quasi-experimental study performed in a university residential hall (Cheung *et al.* 2018) where, after installation of a new plastic recycling bin, students' pro-environmental behaviours increased. Two more experimental studies lead to similar conclusions. In an experiment with university students, staff and visitors (Fritz *et al.*, 2017), recycling bins were placed close to trashcans and recycling rates increased. In another experiment (McCoy *et al.*, 2018), modifications were made to the location of waste and recycling containers and recycling improved significantly. The findings of a survey with students in Texas highlighted the need for additional recycling bins in places where they are not present to enhance waste recycling in the university. Further, plastic recycling bins should be placed not only outside the campus but also inside, especially near the vending machines (Beard, 2002). An inadequate and unbalanced distribution of recycling bins in universities makes recycling by students and staff more difficult (Geng *et al.*, 2013; Marquardt *et al.*, 2013). In an experiment in US, it was shown that the willingness of students to recycle in their apartments is enhanced if they have recycling bins inside their building (Pike *et al.*, 2003). In contrast to private houses, in students' residences, it is difficult to find recycle bins and the rate of recycling is low. This difficulty directly influences the recycling behaviour of students (Robertson and Walkington, 2009). A dispersed campus layout and low availability of bins are also reported as preventing recycling in a case study conducted by Weaver *et al.* (2015). Zhang *et al.* (2017) found that a good waste separation infrastructure is closely related to students' waste recycling behaviours. Focusing on the kitchen/cafeteria of the university campus, Mason *et al.* (2004) noted that the limited space hinders students from recycling-when recycling bins are outside the building, it is easier to throw waste in the dustbin. Convenience of available recycling facilities, in the sense of time and ease, is an important factor that leads to more student involvement in eCycling behaviours (Gonul Kochan *et al.*, 2016). Time constraints were also reported as preventing students' willingness to participate in environmental initiatives in a pilot study by Zain *et al.*

(2016). In addition, Campbell-Arvai (2015) showed that behaviours that require low effort or little substantial change are generally associated with students' food-related choices, such as reducing food waste and recycling. In another study on food-related behaviours, Wang (2016) reported that many students engage in non-green behaviours, such as running water when not necessary, because this requires less effort. Availability of practical information and guidelines on how to recycle has also been found to affect recycling intentions/behaviours in higher education institutions. In a case study at a large university, Weaver *et al.* (2015) found that recycling is strongly influenced by the university context and by the process designed to promote recycling. In particular, information on written posters was deemed important to promote recycling behaviour. A general lack of information on how to properly recycle is often reported (Beard, 2002; Owens and Halfacre-Hitchcock, 2006; Kaplowitz *et al.*, 2009). As a consequence, a lack of guidelines or ambiguity of provided information prevents students from recycling (Kelly *et al.*, 2006). Some clear indication marks could facilitate students' recycling (Geng *et al.*, 2013). Information on how to distinguish and correctly classify waste is also reported as a factor that influences students' recycling behaviours (Zhang *et al.*, 2017). In another case, in Michigan State University campus, students and staff stated that it was not clear which items could be recycled within the campus. Also, they noted that they were aware of the availability of recycling bins, but not of their precise location (Olson *et al.*, 2011). Guidelines and correct signage have also been identified in other research as low-cost initiatives that could be implemented to enhance recycling rates in universities, both for students (Cheung *et al.*, 2018) and for university staff (Ebrahimi and North, 2017). In a comparative study by Ferronato *et al.* (2017), a general lack of knowledge was deemed responsible for low recycling rates in universities. Moreover, in research to explore the application of special recycling bins, a general lack of obstacles was reported as a necessary condition to improve waste separation practices (Supakata, 2018).

Last, several studies have provided evidence regarding socio-demographic characteristics associated with higher recycling rates. Female university students generally display more environmental behaviours and engagement in recycling activities (Campbell-Arvai, 2015; Flagg and Bates, 2016; Izagirre-Olaizola *et al.*, 2015; Meyer, 2016; Zhang *et al.*, 2017). In an exploratory study with undergraduates in a large US university, Shim (1995) analysed the role of gender, age and ethnicity on waste recycling behaviour. A strong relationship emerged, where female students and older students were more highly predisposed to adopt environmentally friendly behaviours. Similar findings have been reported in other studies focusing on non-academic staff (Davis *et al.*, 2009; Robertson and Walkington, 2009). In the case of the experiment with reusable cups at a lower price, female students were more likely to use these cups (Harris and Probert, 2009). With respect to age, younger members of academic staff have been found to pay less attention to recycling methods at work (Davis *et al.*, 2009). Meyer (2016) found that the probability of environmental behaviours increases with each year of college education. Ethnic minorities were also found to be more likely to be engaged in recycling activities. On

the contrary, the analysis of Shim (1995) pointed out that white students were more interested/careful with respect to the environment than non-white students. Religiosity, on the other hand, seems to have no effect on recycling rates at universities (Arli, 2017). Finally, as Davis *et al.* (2009) demonstrated via a survey, married participants and participants who were parents recycled more at home and at work compared with other participants.

Table 1 synthesises factors influencing recycling intentions/behaviours in higher education institutions that emerged from the literature review and socio-demographic characteristics associated with higher recycling rates.

To systematise results, the factors influencing recycling intentions/behaviours in higher education institutions can be classified according to the Theory of Reasoned Action (TRA). The TRA, grounded in social psychology, was developed by Fishbein and Ajzen (1975) to explain behavioural intentions. Ajzen and Fishbein (1980) defined such behavioural intentions as a function of two determinants: a person's attitude towards the action and a person's social norms. Attitude refers to the evaluation of the performance of a specific behaviour, while social norms are related to "perceived social pressure to perform or not perform a specific behavior" (Ajzen, 1991, p. 188; Madden *et al.*, 1992, p. 3). Intentions are then strongly related to performing a specific behaviour (Fishbein and Ajzen, 1975).

The TRA has been widely used to study different contexts such as health behaviours, voting and consuming organic food (Netemeyer and Bearden, 1992; Lee and Green, 1991). It has also been adopted in the area of green marketing to explain environmentally related behaviours such as recycling (Davies *et al.*, 2002) and green purchasing (Ha and Janda, 2012; Wahid *et al.*, 2011; Sparks and Shepherd, 1992). Previous literature on recycling behaviours has shown that recycling intentions are influenced by willingness to recycle, convenience of available recycling facilities, attitudes towards recycling and social norms (Calvin *et al.*, 2012; Chu and Chiu, 2003; Kelly *et al.*, 2006; Sidique *et al.*, 2010; Tonglet *et al.*, 2004).

In the current study, we propose a model based on the TRA but adapted to the specificities of the higher education context, i.e. TURRA (Theory of University Recycling Reasoned Action). In particular, environmental concern and university environmental policies can be considered antecedents of recycling attitudes. Attitudes and social norms affect recycling intentions, which in turn affect recycling behaviours. The availability of recycling facilities moderates the relationship between recycling attitudes and intentions and recycling intentions and behaviours, as shown in Figure 5.

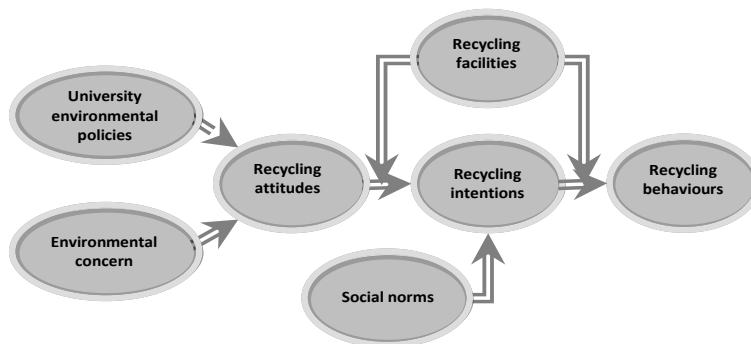
Tab. 1: Factors influencing recycling intentions/behaviours in higher education institutions

Rezarta Sallaku
 Rossella Baratta
 Angelo Bonfanti
 Vanja Vigolo
 Recycling behaviour
 in higher education
 institutions: a systematic
 literature review

<i>Environmental concern</i>	
Environmental concern	Browne and Kaldenberg, 1997; Joung and Park-Poaps, 2013; Jiménez-Parra <i>et al.</i> , 2014; Abubakar <i>et al.</i> , 2016; Han and Hyun, 2018
Environmental awareness	Vitell and Muncy, 2005; Davis <i>et al.</i> , 2009; Robertson and Walkington, 2009; Basri <i>et al.</i> , 2016; Wang, 2016; Abubakar <i>et al.</i> , 2016; Aksan and Çelikler, 2017; Omran <i>et al.</i> , 2017; Alves and Farina, 2018
Awareness of environmental pollution	Zhang <i>et al.</i> , 2017
Awareness of environmental consequences	Davis <i>et al.</i> , 2009; Gonul <i>et al.</i> , 2016
Environmental knowledge	Kaplowitz <i>et al.</i> , 2009; Izagirre-Olaizola <i>et al.</i> , 2015
Environmental values	Flagg and Bates, 2016
Psychological ownership	Felix and Almaguer, 2019
Pro-environmental worldview	Campbell-Arvai, 2015
<i>Social norms</i>	
Friends Family Peers Professors	Robertson and Walkington, 2009; Joung and Park-Poaps 2013; Apinapath <i>et al.</i> , 2015; Zhang <i>et al.</i> , 2017; Sanganyado and Nkomo, 2018; Han and Hyun, 2018
<i>Attitudes</i>	
Attitudes towards recycling	Joung, 2013; Apinapath <i>et al.</i> , 2015; Gonul <i>et al.</i> , 2016; Gallo <i>et al.</i> , 2017; Han and Hyun, 2018
<i>University environmental policy</i>	
Waste minimisation activities	De Vega <i>et al.</i> , 2003; Mason <i>et al.</i> , 2004; Maldonado, 2006; Owens and Halfacre-Hitchcock, 2006; Kaplowitz <i>et al.</i> , 2009; Smyth <i>et al.</i> , 2010; Kurland, 2011; Baldwin and Dripps, 2012; Zain <i>et al.</i> , 2012; Barros <i>et al.</i> , 2013; Cole and Fieselman, 2013; Posey and Webster, 2013; Zain <i>et al.</i> , 2013; Becker <i>et al.</i> , 2014; Fagnani and Guimarães, 2017
Specific examples: Double-sided printers Reusable cups Technological bins	Amutenya <i>et al.</i> , 2009 Harris and Probert, 2009 Mozo-Reyes <i>et al.</i> , 2016
Environmental education	De Vega <i>et al.</i> , 2003; Pike <i>et al.</i> , 2003; Tahara <i>et al.</i> , 2015; Choi <i>et al.</i> , 2017
Staff training	Brennan <i>et al.</i> , 2015; Bitanga, 2017
<i>Recycling facilities</i>	
Availability of recycling bins	Beard, 2002; Pike <i>et al.</i> 2003; Robertson and Walkington, 2009; O'Connor <i>et al.</i> , 2010; Leodir Löbler <i>et al.</i> , 2012; Geng <i>et al.</i> , 2013; Marquardt <i>et al.</i> , 2013; Apinapath <i>et al.</i> , 2015; Weaver <i>et al.</i> , 2015; Ebrahimi and North, 2017; Fritz <i>et al.</i> , 2017; Binder <i>et al.</i> , 2017; Zhang <i>et al.</i> , 2017; McCoy <i>et al.</i> , 2018; Cheung <i>et al.</i> , 2018
Availability of information	Beard, 2002; Owens and Halfacre-Hitchcock, 2006; Kelly <i>et al.</i> , 2006; Kaplowitz <i>et al.</i> , 2009; Olson <i>et al.</i> , 2011; Geng <i>et al.</i> , 2013; Weaver <i>et al.</i> , 2015; Zhang <i>et al.</i> , 2017; Ebrahimi and North, 2017; Ferronato <i>et al.</i> , 2017; Cheung <i>et al.</i> , 2018
Time/effort constraints	Mason <i>et al.</i> , 2004; Campbell-Arvai, 2015; Wang, 2016; Gonul <i>et al.</i> , 2016; Zain <i>et al.</i> , 2016; Supakata, 2018
<i>Socio-demographic characteristics</i>	
Gender	Shim, 1995; Davis <i>et al.</i> , 2009; Robertson and Walkington, 2009; Harris and Probert, 2009; Campbell-Arvai, 2015; Izagirre-Olaizola, 2015; Flagg and Bates, 2016; Meyer, 2016; Zhang <i>et al.</i> , 2017
Age	Shim, 1995; Davis <i>et al.</i> , 2009; Robertson and Walkington, 2009; Meyer, 2016
Ethnicity	Shim, 1995; Meyer, 2016
Religion	Arli, 2017
Marital status	Davis <i>et al.</i> , 2009
Having children	Davis <i>et al.</i> , 2009

Source: Our elaboration

Fig. 5: TURRA model



Source: Our elaboration

4. Future research directions and conclusions

The systematic literature review conducted in this study has revealed several literature gaps that represent important opportunities for future research directions.

A first gap concerns the determinants of recycling attitudes. From the literature analysis, university environmental policies and environmental concern emerged as key factors affecting attitudes towards recycling. With reference to university policies, three interesting fields of research for future studies are highlighted: a) the use of customer education activities, b) the use of social media communication and c) the use of gamification techniques. First, customer education activities are educational initiatives undertaken to “better educate, inform, and develop the knowledge and skills of the customers” (Antonios, 2011, p. 3; Brunetti and Bonfanti, 2015; Viassone *et al.*, 2018) about recycling. Such initiatives could be directed not only at students and higher institution personnel, but more broadly, at the local community of stakeholders. In fact, stakeholder engagement represents an inclusive and bottom-up approach often considered more effective than traditional top-down approaches in developing policy design and implementation. Second, with regard to the use of online communication tools (e.g. Siano *et al.*, 2017), future research could explore the effect of social media communication in developing environmental knowledge, raising awareness about specific environmental issues and informing the community about the positive effects of recycling behaviour. Finally, research could be directed to understanding the potentialities of gamification to increase customer engagement in recycling practices. Gamification can be defined as “the use of game design elements in non-game contexts” (Deterding *et al.*, 2011, p. 10). More specifically, “Gamification is a developing approach for encouraging user motivation, engagement and enjoyment in non-gaming, computer-mediated environments” (Seaborn and Fels, 2015, p. 29). Recent studies have shown that gamification can be an effective tool to promote sustainable behaviour in different contexts, such as tourism (e.g. Negrusa *et al.*, 2015) and urban mobility (e.g. Kazhamiakin *et al.*, 2015). There is a need to further explore

the role of gamification to increase environmental concern and create a positive attitude towards recycling.

A second research gap that emerged from the literature analysis concerns the effect of social norms on recycling intentions. The majority of studies focused on peers, family members and friends. Future research could investigate if and how local community influences recycling intentions in higher education institutions. In other words, it would be interesting to examine if and how the sense of community, those who live in a specific territory, could lead to more pro-environmental behaviour by reporting different levels of recycling and, consequently, increasing willingness to minimise waste. In this sense, local authorities could (or not) assume an important role.

Although some studies have already explored the direct effect of recycling facilities on recycling intentions, as well as on recycling behaviour, a third research gap and future research direction is represented by the need to further investigate the moderating effect of recycling facilities on the relationship between attitudes and intentions, as well as on the relationship between intentions and recycling behaviour. It is proposed that recycling facilities can reinforce the effect of a positive attitude towards recycling on recycling intentions, as well as reinforce the effect of willingness to recycle on actual behaviour.

Finally, some of the examined studies focused on recycling intentions without further investigating how intentions affect actual behaviour, while other studies examined the direct effect of environmental concern, university policies or recycling facilities on behaviour. Future research should adopt a more comprehensive approach by considering both the determinants of intentions and the factors influencing actual recycling behaviour.

Limitations of the analysis conducted should be acknowledged. First, data collection was limited to peer-reviewed articles present in Scopus. While this database provides wide coverage of the academic literature, future studies could expand the data collection to other databases such as Web of Science or Google Scholar, to include recent conference contributions as well as other types of research reports. Second, future studies could include a wider set of keywords to expand the results to recycling behaviour of millennials, even outside higher education institutions. Finally, while a rigorous analysis was conducted to reduce subjectivity in the identification of the themes, future studies could refine the categorisation with the support of software such as NVivo.

To conclude, the study of factors directly or indirectly affecting recycling intentions and behaviour in higher education institutions represents a promising field of research. Recent development in technologies may stimulate new ways to engage customers and promote more sustainable behaviours among students, higher education institutions' personnel and the broader community of stakeholders.

- ABUBAKAR I., AL-SHIHRI F., AHMED S. (2016), "Students' Assessment of Campus Sustainability at the University of Dammam, Saudi Arabia", *Sustainability*, vol. 8, n. 1, pp. 59.
- AJZEN I. (1991), "The theory of planned behaviour", *Organizational Behavior and Human Decision Process*, vol. 50, n. 2, pp. 179-211.
- AJZEN I., FISHBEIN M. (1980), *Understanding Attitudes and Predicting Social Behavior*, NJ: Prentice-Hall, Englewood Cliffs.
- AKSAN Z., ÇELIKLER D. (2017), "The development of a recycling awareness scale for prospective science teachers", *Educational Studies*, vol. 43, n. 5, pp. 567-583.
- ALTAN H. (2010), "Energy efficiency interventions in UK higher education institutions", *Energy Policy*, vol. 38, n. 12, pp. 7722-7731.
- ALVES D.S., FARINA M.C. (2018), "Disposal and reuse of the information technology waste: a case study in a Brazilian university", *European Business Review*, vol. 30, n. 6, pp. 720-734.
- AMUTENYA N., SHACKLETON C.M., WHITTINGTON-JONES K. (2009), "Paper recycling patterns and potential interventions in the education sector: A case study of paper streams at Rhodes University, South Africa", *Resources, Conservation and Recycling*, vol. 53, n. 5, pp. 237-242.
- ANTONIOS J. (2011), "Understanding the effects of customer education on customer loyalty", *Business Leadership Review*, vol. 8, n. 1, pp. 1-15.
- APINHAPATH C., TANASUGARN C., CHANSATIPORN N., STECKLER A. (2015), "Determinants predicting intention to properly dispose of used batteries", *Kasetsart Journal - Social Sciences*, vol. 36, pp. 173-182.
- ARLI D. (2017), "Does ethics need religion? Evaluating the importance of religiosity in consumer ethics", *Marketing Intelligence and Planning*, vol. 35, n. 2, pp. 205-221.
- BALDWIN E., DRIPPS W. (2012), "Spatial characterization and analysis of the campus residential waste stream at a small private liberal arts institution", *Resources, Conservation and Recycling*, vol. 65, pp. 107-115.
- BARROS R.M., TIAGO FILHO G.L., MOURA J.S., PIERONI M.F., VIEIRA F.C., LAGE L.R., BASTOS A.S. (2013), "Design and implementation study of a Permanent Selective Collection Program (PSCP) on a University campus in Brazil", *Resources, Conservation and Recycling*, vol. 80, n. November 2013, pp. 97-106.
- BASRI N.E.A., ZAWAWI M.A., ZAIN S.M., MOHAMAD W.N.A.W., KASA A. (2016), "Effects of an awareness programme on the perception of engineering students at the universiti kebangsaan Malaysia towards solid waste recycling practices", *Pertanika Journal of Social Sciences and Humanities*, vol. 24, n. April 2016, pp. 1-14.
- BEARD R.S. (2002), "Measuring greenness: A study of the Southwest Texas state university recycling program", *Geographical Bulletin - Gamma Theta Upsilon*, vol. 44, n. 2, pp. 78-91.
- BECKER C.M., AYSUCUE E., BROCKETT S.J., SCAROLA G., KELLE T. (2014), "Initiating sustainable behavior: Feel good for doing good", *Electronic Green Journal*, vol. 1, n. 37, pp. 1-12.
- BINDER K., GLASSER H., FUQUA R.W. (2017), "A Behavioral Approach to the Development of a Campus-Wide Recycling System", *Sustainability (United States)*, vol. 10 n. 1, pp. 39-44.

- BITANGA M.J.S. (2017), "Impact assessment of the PC recycling project in Region 2", *Advanced Science Letters*, vol. 23, n. 2, pp. 873-876.
- BOOTH A., PAPAIOANNOU D., SUTTON A. (2012), *Systematic approaches to a successful literature review*, SAGE Publications, London.
- BRENNAN L., BINNEY W., HALL J., HALL M. (2015), "Whose Job Is That? Saving the Biosphere Starts at Work", *Journal of Nonprofit and Public Sector Marketing*, vol. 27, n. 3, pp. 307-330.
- BROWNE B.A., KALDENBERG D.O. (1997), "Conceptualizing self-monitoring: Links to materialism and product involvement", *Journal of Consumer Marketing*, vol. 14, n. 1, pp. 31-44.
- BRUNETTI F., BONFANTI A. (2015), "Effects of customer education in terms of customer perceived value: the role of customer evaluation skills", *Sinergie Italian Journal of Management*, vol. 33, n. 97, pp. 219-238.
- CALVIN W., RONNIE C., GEOFFREY QIPING S. (2012), "Recycling attitude and behaviour in university campus: a case study in Hong Kong", *Facilities*, vol. 30, n. 1, pp. 630-646.
- CAMPBELL-ARVAI V. (2015), "Food-related environmental beliefs and behaviours among university undergraduates: A mixed-methods study", *International Journal of Sustainability in Higher Education*, vol. 16, n. 3, pp. 279-295.
- CHEUNG T.Y., FOK L., CHEANG C.C., YEUNG C.H., SO W.M.W., CHOW C.F. (2018), "University halls plastics recycling: a blended intervention study", *International Journal of Sustainability in Higher Education*, vol. 19, n. 6, pp. 1038-1052.
- CHOI Y., OH M., KANG J., LUTZENHISER L. (2017), "Plans and Living Practices for the Green Campus of Portland State University", *Sustainability*, vol. 9, n. 2, pp. 252.
- CHU P.Y., CHIU J.F. (2003), "Factors influencing household waste recycling behavior: test of an integrated model 1", *Journal of Applied Social Psychology*, vol. 33, n. 3, pp. 604-626.
- COLE E.J., FIESELMAN L. (2013), "A community-based social marketing campaign at Pacific University Oregon: Recycling, paper reduction, and environmentally preferable purchasing", *International Journal of Sustainability in Higher Education*, vol. 14, n. 2, pp. 176-195.
- CORTESE A.D. (1992), "Education for an environmentally sustainable future", *Environmental Science and Technology*, vol. 26, n. 6, pp. 1108-1114.
- DAVIES J., FOXALL G.R., PALLISTER J. (2002), "Beyond the intention-behaviour mythology: an integrated model of recycling", *Marketing Theory*, vol. 2, n. 1, pp. 29-113.
- DAVIS G., O'CALLAGHAN F., KNOX K. (2009), "Sustainable attitudes and behaviours amongst a sample of non-academic staff: A case study from an Information Services Department, Griffith University, Brisbane", *International Journal of Sustainability in Higher Education*, vol. 10, n. 2, pp. 136-151.
- DE VEGA C.A., OJEDA-BENÍTEZ S., RAMÍREZ-BARRETO M.E. (2003), "Mexican educational institutions and waste management programmes: a University case study", *Resources, Conservation and Recycling*, vol. 39, n. 3, pp. 283-296.
- DENYER D., TRANFIELD D. (2009), "Producing a systematic review", *The Sage handbook of organizational research methods*, pp. 671-689, SAGE Publications, London.
- DETERDING S., SICART M., NACKE L., O'HARA K., DIXON D. (2011), "Gamification. using game-design elements in non-gaming contexts", in *CHI'11 extended abstracts on human factors in computing systems*, pp. 2425-2428.

Rezarta Sallaku
 Rossella Baratta
 Angelo Bonfanti
 Vanja Vigolo
 Recycling behaviour
 in higher education
 institutions: a systematic
 literature review

- EBRAHIMI K., NORTH L.A. (2017), "Effective strategies for enhancing waste management at university campuses", *International Journal of Sustainability in Higher Education*, vol. 18, n. 7, pp. 1123-1141.
- FAGNANI E., GUIMARÃES J.R. (2017), "Waste management plan for higher education institutions in developing countries: The Continuous Improvement Cycle model", *Journal of Cleaner Production*, vol. 147, pp. 108-118.
- FELIX R., ALMAGUER J. (2019), "Nourish what you own: psychological ownership, materialism and pro-environmental behavioral intentions", *Journal of Consumer Marketing*, vol. 36, n. 1, pp. 82-91.
- FERRONATO N., D'AVINO C., RAGAZZI M., TORRETTA V., DE FEO G. (2017), "Social Surveys about Solid Waste Management within Higher Education Institutes: A Comparison", *Sustainability*, vol. 9, n. 3, pp. 391.
- FISHBEIN M., AJZEN I. (1975), *Beliefs, Attitude, Intention and Behavior: An Introduction to Theory and Research*, Addison-Wesley, Reading, MA.
- FLAGG J.A., BATES D.C. (2016), "Recycling as a result of "cultural greening"?", *International Journal of Sustainability in Higher Education*, vol. 17, n. 4, pp. 489-505.
- FRITZ J.N., DUPUIS D.L., WU W.-L., NEAL A.E., RETTIG L.A., LASTRAPES R.E. (2017), "Evaluating increased effort for item disposal to improve recycling at a university: effects of bin location on recycling", *Journal of Applied Behavior Analysis*, vol. 50, n. 4, pp. 825-829.
- GALLO M., MAROTTA V., MAGRASSI F., TARAMASSO A.C., DEL BORGH I. A. (2017), "University campus waste prevention and reduction: A circular-economy approach", *Economics and Policy of Energy and the Environment*, vol. 1, pp. 235-252.
- GENG Y., LIU K., XUE B., FUJITA T. (2013), "Creating a "green university" in China: a case of Shenyang University", *Journal of Cleaner Production*, vol. 61, pp. 13-19.
- GONUL KOCHAN C., POURREZA S., TRAN H., PRYBUTOK V.R. (2016), "Determinants and logistics of e-waste recycling", *The International Journal of Logistics Management*, vol. 27, n. 1, pp. 52-70.
- HA H.Y., JANDA S. (2012), "Predicting consumer intentions to purchase energy-efficient products", *Journal of Consumer Marketing*, vol. 29, n. 7, pp. 461-469.
- HAN H., HYUN S.S. (2018), "College youth travelers' eco-purchase behavior and recycling activity while traveling: an examination of gender difference", *Journal of Travel and Tourism Marketing*, vol. 35, n. 6, pp. 740-754.
- HARRIS B.K., PROBERT E.J. (2009), "Waste minimisation at a Welsh university: A viability study using choice modelling", *Resources, Conservation and Recycling*, vol. 53, n. 5, pp. 269-275.
- INOUE Y., ALFARO-BARRANTES P. (2015), "Pro-environmental Behavior in the Workplace: A Review of Empirical Studies and Directions for Future Research", *Business and Society Review*, vol. 120, n. 1, pp. 137-160.
- IZAGIRRE-OLAIZOLA J., FERNÁNDEZ-SAINZ A., VICENTE-MOLINA M.A. (2015), "Internal determinants of recycling behaviour by university students: A cross-country comparative analysis", *International Journal of Consumer Studies*, vol. 39, n. 1, pp. 25-34.
- JACSÓ P. (2011), "The h-index, h-core citation rate and the bibliometric profile of the Scopus database", *Online Information Review*, vol. 35, n. 3, pp. 492-501.
- JIMÉNEZ-PARRA B., RUBIO S., VICENTE-MOLINA M.A. (2014), "Key drivers in the behavior of potential consumers of remanufactured products: a study on laptops in Spain", *Journal of Cleaner Production*, vol. 85, n. 15 December 2014, pp. 488-496.

- JOUNG H.M. (2013), "Materialism and clothing post-purchase behaviors", *Journal of Consumer Marketing*, vol. 30, n. 6, pp. 530-537.
- JOUNG H.M., PARK-POAPS H. (2013), "Factors motivating and influencing clothing disposal behaviours", *International Journal of Consumer Studies*, vol. 37, n. 1, pp. 105-111.
- KAPLOWITZ M.D., YEBOAH F.K., THORP L., WILSON A.M. (2009), "Garnering input for recycling communication strategies at a Big Ten University", *Resources, Conservation and Recycling*, vol. 53, n. 11, pp. 612-623.
- KAZHAMIKIN R., MARCONI A., PERILLO M., PISTORE M., VALETTO G., PIRAS L., PERRI N. (2015), "Using gamification to incentivize sustainable urban mobility", in *2015 IEEE First International Smart Cities Conference (ISC2)*, pp. 1-6.
- KELLY T.C., MASON I.G., LEISS M.W. (2006), "University community responses to on-campus resources recycling", *Resources Conservation and Recycling*, vol. 47, n. 1, pp. 42-55.
- KURLAND N.B. (2011), "Evolution of a campus sustainability network: a case study in organizational change", *International Journal of Sustainability in Higher Education*, vol. 12, n. 4, pp. 395-429.
- LEE C., GREEN R.T. (1991), "Cross-cultural examination of the Fishbein behavioral intentions model", *Journal of International Business Studies*, vol. 22, n. 2, pp. 289-305.
- LEODIR LÖBLER M., GOMES DA SILVA B., POZZOBON D.M., MAFFINI GOMES C. (2012), "Strategic orientation towards sustainable innovation: A case study in a Brazilian University", *Journal of Technology Management and Innovation*, vol. 7, n. 2, pp. 196-206.
- LIGHTFOOT H., BAINES T., SMART P. (2013), "The servitization of manufacturing", *International Journal of Operations and Product Management*, vol. 33, n. 11/12, pp. 1408-1434.
- MADDEN T.J., ELLEN P.S., AJZEN I. (1992), "A comparison of the theory of planned behavior and the theory of reasoned action", *Personality and Social Psychology Bulletin*, vol. 18, n. 1, pp. 3-9.
- MALDONADO L. (2006), "The economics of urban solid waste reduction in educational institutions in Mexico: A 3-year experience", *Resources, Conservation and Recycling*, vol. 48, n. 1, pp. 41-55.
- MARCELL K., AGYEMAN J., RAPPAPORT A. (2004), "Cooling the campus: Experiences from a pilot study to reduce electricity use at Tufts University, USA, using social marketing methods", *International Journal of Sustainability in Higher Education*, vol. 5, n. 2, pp. 169-189.
- MARQUARDT K.D., RANKIN M.L., SIMPKINS W.W. (2013), "Town meets gown: creating a collaborative process for expanding a university's recycling program while supporting a city's waste diversion efforts", *Sustainability: The Journal of Record*, vol. 6, n. 2, pp. 104-114.
- MASON I.G., OBERENDER A., BROOKING A.K. (2004), "Source separation and potential re-use of resource residuals at a university campus", *Resources, Conservation and Recycling*, vol. 40, n. 2, pp. 155-172.
- MCCOY K., OLIVER J.J., BORDEN D.S., COHN, S.I. (2018), "Nudging waste diversion at Western State Colorado University: application of behavioral insights", *International Journal of Sustainability in Higher Education*, vol. 19, n. 3, pp. 608-621.

- MERLI R., PREZIOSI M., ACAMPORA A. (2018), "How do scholars approach the circular economy? A systematic literature review", *Journal of Cleaner Production*, vol. 178, n. 20 March 2018, pp. 703-722.
- MEYER A. (2016), "Heterogeneity in the preferences and pro-environmental behavior of college students: the effects of years on campus, demographics, and external factors", *Journal of Cleaner Production*, vol. 112, n. Part 4, pp. 3451-3463.
- MOZO-REYES E., JAMBECK J.R., REEVES P., JOHNSEN K. (2016), "Will they recycle? Design and implementation of eco-feedback technology to promote on-the-go recycling in a university environment", *Resources, Conservation and Recycling*, vol. 114, n. November 2016, pp. 72-79.
- MTUTU P., THONDHLANA G. (2016), "Encouraging pro-environmental behaviour: Energy use and recycling at Rhodes University, South Africa", *Habitat International*, vol. 53, n. April 2016, pp. 142-150.
- NEGRUŞA A., TOADER V., SOFIĂ A., TUTUNEA M., RUS R. (2015), "Exploring gamification techniques and applications for sustainable tourism", *Sustainability*, vol. 7, n. 8, pp. 11160-11189.
- NETEMEYER R.G., BEARDEN W.O. (1992), "A comparative analysis of two models of behavioral intention", *Journal of the Academy of Marketing Science*, vol. 20, n. 1, pp. 49-59.
- O'CONNOR R.T., LERMAN D.C., FRITZ J.N., HODDE H.B. (2010), "Effects of number and location of bins on plastic recycling at a university", *Journal of Applied Behavior Analysis*, vol. 43, n. 4, pp. 711-715.
- OGUZ D., ÇAKCI I., KAVAS S. (2010), "Environmental awareness of university students in Ankara, Turkey", *African Journal of Agricultural Research*, vol. 5, n. 19, pp. 2629-2636.
- OLSON L., ARVAI J., THORP L. (2011), "Mental models research to inform community outreach for a campus recycling program", *International Journal of Sustainability in Higher Education*, vol. 12, n. 4, pp. 322-337.
- OMRAN A., BAH M., BAHARUDDIN A.H. (2017), "Investigating the level of environmental awareness and practices on recycling of solid wastes at university's campus in Malaysia", *Journal of Environmental Management and Tourism*, vol. 8, n. 3, pp. 554-566.
- OWENS K.A., HALFACRE-HITCHCOCK A. (2006), "As green as we think? The case of the College of Charleston green building initiative", *International Journal of Sustainability in Higher Education*, vol. 7, n. 2, pp. 114-128.
- PIKEL., SHANNONT., LAWREMORE K., MCGEE A., TAYLORM., LAMOREAUX G. (2003), "Science education and sustainability initiatives: A campus recycling case study shows the importance of opportunity", *International Journal of Sustainability in Higher Education*, vol. 4, n. 3, pp. 218-229.
- POSEY M.J., WEBSTER A.H. (2013), "Environmental sustainability practices in publicly supported two-year colleges in the Southern United States", *Community College Journal of Research and Practice*, vol. 37, n. 10, pp. 800-803.
- ROBERTSON S., WALKINGTON H. (2009), "Recycling and waste minimisation behaviours of the transient student population in Oxford: results of an on-line survey", *Local Environment*, vol. 14, n. 4, pp. 285-296.
- SALDANA J. (2009), *The coding manual for qualitative researchers*, SAGE, Los Angeles.

- SANGANYADO E., NKOMO S. (2018), "Incorporating Sustainability into Engineering and Chemical Education Using E-Learning", *Education Sciences*, vol. 8, n. 2, pp. 39.
- SEABORN K., FELLS D.I. (2015), "Gamification in theory and action: A survey", *International Journal of human-computer studies*, vol. 74, pp. 14-31.
- SHIM S. (1995), "Environmentalism and consumers' clothing disposal patterns: an exploratory study", *Clothing and Textiles Research Journal*, vol. 13, n. 1, pp. 38-48.
- SIANO A., CONTE F., PICIOCCHI P., VOLLERO A., AMABILE S. (2017), "Valutare e migliorare la comunicazione digitale per la sostenibilità: un modello operativo per i siti web", *Sinergie Italian Journal of Management*, vol. 35, n. 103, pp. 81-103.
- SIDIQUE S.F., LUPI F., JOSHI S.V. (2010), "The effects of behavior and attitudes on drop-off recycling activities", *Resources, Conservation and Recycling*, vol. 54, n. 3, pp. 163-170.
- SMYTH D.P., FREDEEN A.L., BOOTH A.L. (2010), "Reducing solid waste in higher education: the first step towards 'greening' a university campus", *Resources, Conservation and Recycling*, vol. 54, n. 11, pp. 1007-1016.
- SPARKS P., SHEPHERD R. (1992), "Self-identity and the theory of planned behavior: Assessing the role of identification with green consumerism", *Social Psychology Quarterly*, vol. 55, n. 4, pp. 388-399.
- STEMLER S. (2001), "An overview of content analysis", *Practical Assessment, Research and Evaluation*, vol. 7, n. 17, pp. 1-5.
- SUPAKATA N. (2018), "Bin monsters for promoting waste separation behavior", *Applied Environmental Education and Communication*, vol. 17, n. 4, pp. 310-322.
- TAHARA D.C., BURATHOKI B., GILL J., JOSEPH A. (2015), "On the road to a green New York medical college", *International Journal of Sustainability Education*, vol. 11, n. 4, pp. 21-36.
- TONGLET M., PHILLIPS P.S., READ A.D. (2004), "Using the Theory of Planned Behaviour to investigate the determinants of recycling behaviour: a case study from Brixworth, UK", *Resources, conservation and recycling*, vol. 41, n. 3, pp. 191-214.
- VAROTTO, A., SPAGNOLLI, A. (2017), "Psychological strategies to promote household recycling. A systematic review with meta-analysis of validated field interventions", *Journal of Environmental Psychology*, vol. 51, n. August 2017, pp. 168-188.
- VIASSONE M., KITCHEN P. BEN YOUSSEF K. (2018), "Exploring the relationship between customer education and customer satisfaction", *Sinergie Italian Journal of Management*, vol. 36, n. 105, pp. 43-60.
- VIRTANEN Y., NILSSON S. (2013), *Environmental impacts of waste paper recycling*, Routledge, London.
- VITELL S.J., MUNCY J. (2005), "The Muncy-Vitell consumer ethics scale: A modification and application", *Journal of Business Ethics*, vol. 62, n. 3, pp. 267-275.
- WAHID N.A., RAHBAR E., SHYAN T.S. (2011), "Factors influencing the green purchase behavior of Penang environmental volunteers", *International Business Management*, vol. 5, n. 1, pp. 38-49.
- WAN C., CHEUNG R., SHEN G.Q. (2012), "Recycling attitude and behaviour in university campus: A case study in Hong Kong", *Facilities*, vol. 30, n. 13/14, pp. 630-646.

- WANG Y.-F. (2016), "Improving Culinary Education by Examining the Green Culinary Behaviors of Hospitality College Students", *Journal of Hospitality and Tourism Education*, vol. 28, n. 1, pp. 1-9.
- WEAVER S.T., ELLEN P.S., MATHIASSEN L. (2015), "Contextualist Inquiry into Organizational Citizenship: Promoting Recycling Across Heterogeneous Organizational Actors", *Journal of Business Ethics*, vol. 129, n. 2, pp. 413-428.
- YURIEV A., BOIRAL O., FRANCOEUR V., PAILLÉ P. (2018), "Overcoming the barriers to pro-environmental behaviors in the workplace: A systematic review", *Journal of Cleaner Production*, vol. 182, n. 1 May 2018, pp. 379-394.
- ZAIN S.M., BASRI N.E.A., MAHMOOD N.A., BASRI H., YAACOB M., AHMAD M. (2013), "Innovation in Sustainable Education and Entrepreneurship through the UKM Recycling Center Operations", *International Education Studies*, vol. 6, n. 1, pp. 168-176.
- ZAIN S.M., BASRI N.E.A., MAHMOOD N.A., BASRI H., ZAKARIA N., ELFITHRI R., SHAHUDIN Z. (2012), "Recycling practice to promote sustainable behavior at University Campus", *Asian Social Science*, vol. 8, n. 16, p. 163.
- ZAIN S.M., MAHMOOD N.A., BASRI N.E.A., ZAWAWI M.A., MAMAT L.F., SAAD N.F.M. (2016), "Sustainable education model through recycling and ekorelawan volunteering activities", *Pertanika Journal of Social Sciences and Humanities*, vol. 24, n. April 2016, pp. 35-48.
- ZHANG H., LIU J., WEN Z., CHEN Y.X. (2017), "College students' municipal solid waste source separation behavior and its influential factors: A case study in Beijing, China", *Journal of Cleaner Production*, vol. 164, n. 15 October 2017, pp. 444-454.

Academic or professional position and contacts

Rezarta Sallaku

PhD Student of Economics and Management
University of Verona - Italy
e-mail: rezarta.sallaku@univr.it

Rossella Baratta

Research Fellow in Business Management
University of Verona - Italy
e-mail: rossella.baratta@univr.it

Angelo Bonfanti

Associate Professor of Business Management
University of Verona - Italy
e-mail: angelo.bonfanti@univr.it

Vania Vigolo

Associate Professor of Business Management
University of Verona - Italy
e-mail: vania.vigolo@univr.it



sinergie
italian journal of management

ISSN 0393-5108
DOI 10.7433/s110.2019.06
pp. 127-148



Italian Society of
MANAGEMENT