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Environmentally sustainable interior design: A snapshot of current supply of and demand for green, sustainable or Fair Trade products for interior design practice

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Abstract

Although environmentally sustainable interior design (ESID) has become a major issue in interior design practice, according to the literature the frequency with which interior designers make sustainable choices in real practice is still limited, particularly where materials selection is concerned. This research aimed to develop a comprehensive understanding of what constitutes a sustainable material choice and subsequently undertake a study of the current supply of and demand for green, sustainable and Fair Trade (GSFT) products for interior design practice.

In the first instance a desk study of currently available GSFT materials was undertaken. Following this non-participant structured observation of accessibility of GSFT products and a survey on the supply of GSFT materials was undertaken. Finally semi structured interviews with retailers were conducted.

The results demonstrate the wide range of GSFT products that are currently in the marketplace (including fabrics, window treatments, surface materials, flooring, walls and ceilings) and indeed many of these materials and products could be sourced from the retail outlets surveyed during the research. However it was not easy to readily identify GSFT products and frequently the researcher had to look through volumes of materials, relying on personal knowledge and manufacturers' literature to determine the provenance of the materials marketed. Sourcing products in this way is inefficient and time consuming and has been highlighted as a barrier to engaging in ESID in the literature.

Only a small number of the retailers interviewed have actively encouraged their customers to purchase GSFT. This reluctance to promote GSFT may reflect a lack of information on the provenance of materials to hand but also their belief that people are not aware of the benefits of either sustainable or green materials and therefore not engaged in ESID. If they perceived that there was a greater demand for GSFT products, the retailers may choose to promote these materials more effectively.

The research has confirmed how difficult it is to find information on the provenance of materials to encourage the practice of ESID. Better access to a basic knowledge of sustainability as well as more up-to-date information about sustainable materials will play a critical role in promoting sustainable practice.

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1. Introduction

1.1. Transitioning to sustainable design

Traditionally the interior design profession has concerned itself with a one-dimensional practice, to provide aesthetic enhancements to an interior space for a client (Cargo, 2013). Indeed, Yang et al. (2011) describe traditional interior design as relatively backward and conservative, only focusing on fashion, luxury design in small environments; an approach that ignores energy savings and emissions reduction, as well as the harmful effects on consumers' mental and physical health, and environmental pollution (Yang et al., 2011).

However in recent years interior design practice has seen a dramatic shift with design strategies that now focus on providing healthy and sustainable environments for individual's to live, work and play in (Bonda and Sosnowchick, 2007). Society is beginning to recognise the interconnectedness of buildings, people and community in the creation of an environmentally responsible built environment; clients are beginning to understand their role and impact on the environment. As a result they are seeking interiors that demonstrate environmentally responsible, sustainable design (Mazarella et al., 2011; Cargo, 2013).

This interest in environmental responsibility is what has sparked the context and need for environmentally sustainable interior design (ESID) (Jones, 2008).

1.2. Environmentally sustainable interior design (ESID)

ESID is based on the sustainable design principles and strategies common to the built environment as a whole, namely providing physiologically and psychologically healthy indoor environments (Fisk and Rosenfeld, 1997; Kang and Guerin, 2009).

Often the terms green and sustainable are used interchangeably in design. However it is necessary to provide a distinction between the two. In this paper, green design refers to a focus on people issues – their health, safety and welfare; whilst sustainable design encompasses a more global approach – the health, safety and welfare of the planet, so that it is possible for this generation to meet their needs without jeopardising the ability of future generations to meet their own needs (World Commission on Environment and Development, 1987). In addition it is appropriate to consider Fair-trade goods, aimed at helping producers in developing countries achieve better trade conditions and to promote sustainability. There is a focus on getting a better price, decent working conditions and fair terms of trade for farmers and workers worldwide (Fairtrade Foundation, 2014).

The term ESID encompasses all three concepts and it is the responsibility of those charged with creating interior spaces in the built environment to implement ESID in both new-build and in the renovation/retrofit of existing buildings.

In order to achieve this a holistic approach is required, 'one in which all systems and materials are designed with an emphasis on integration into a whole, for the purpose of minimising negative impacts on the environment and occupant and maximising positive impacts on environment, economic and social systems over the life cycle of a project' (Kang and Guerin, 2009 p.180).

Therefore, in comparison with traditional design practices, where designers are primarily focussed on meeting the clients' aesthetic and functional needs, ESID focuses on the materials' intended application, aesthetic qualities, environmental and health impacts, availability, ease of instalment and maintenance, and initial and life cycle costs (Cargo, 2013; Moussatche et al., 2002; Pile, 2003).

Although ESID has become a major issue in interior design practice, according to the literature the frequency with which interior designers make sustainable choices in real practice is still limited (e.g. Cargo, 2013; Kusumarini et al., 2011; Kang and Guerin, 2009). This 'sustainability gap', as described by Steig (2006), is the disparity that exists between the principles of ESID and the reality of practice. It is characterised by a lack of connection made by designers between their practice and the resulting environmental impacts of that practice (Steig, 2006).

1.3. Aims and objectives

As a result, the aim of this research project was to first develop a comprehensive understanding of what constitutes a sustainable or green material choice and subsequently undertake a study to ascertain a snapshot of current supply of and demand for green, sustainable or Fair Trade (GSFT) products for interior design practice.

2. Literature review

2.1. Materials selection

A number of factors should have led to increased interest, specification and purchasing of sustainable materials and products. These include a greater awareness of and sensitivity towards the World's limited natural resources; a growing demand for healthier, more energy-efficient and environmentally responsible homes and work places; the establishment of Green Building Councils and their promotion of policies and programmes aided to implement green building projects, such as BRE's Environmental Assessment Method (BREEAM), Code for Sustainable Homes (CSH), Leadership in Energy and Environmental Design (LEED), Green Star rating systems; municipalities offering incentives to 'go green', such as tax credits for the construction of buildings that are environmentally responsible; and e.g. Environmental Protection Agencies taking on more of a leadership role in actively mandating greener building policies.

However, although there are several groups disseminating information regarding green and sustainable materials

(e.g. the Forestry Stewardship Council (FSC) and 'OneWool' from the British Wool Marketing Board), no one is focussing on developing a comprehensive understanding of environmentally responsible materials (Jones, 2008).

Materials selection has a high impact on the sustainable outcome of all interior design projects but in particular commercial interior design projects, which are generally 'churned' every 5–7 years, placing a heavy burden on resources and creating large amounts of waste (Maté, 2009). As a result of churning, the embodied energy of the furniture, fixtures and fittings can outweigh the operational energy costs of an office building over a forty-year life span (Trelour et al., 1999). Clearly there are heavy costs associated with the selection of unsustainable materials.

This lack of focus on interiors has created an information void for architects, interior designers and facilities managers who want to specify environmentally responsible furnishing, finishes and equipment for interior environments. Many interior designers have limited knowledge about the adverse properties of the materials they specify (Guerin and Ginthner, 1999).

Interior furnishings, materials and finishes require significant quantities of natural resources for their extraction, transport, processing, reuse, recycling and disposal (California Integrated Waste Management Board, 2002). By integrating environmentally sustainable materials into building projects, it is possible to significantly reduce environmental impacts through less energy consumption, less natural resource depletion and pollution, plus less toxicity for both the occupants and the entire ecosystem. These both minimise the negative impacts on the environment and occupants whilst maximising positive impacts over the lifecycle of a building (Araji and Shakour, 2013; Kang and Guerin, 2009).

2.2. Barriers to sustainable materials selection

Little research has yet focused on interior designers' choices of sustainable materials (Lee et al., 2013) and those that have demonstrated on the whole that sustainable materials selection is not a priority. Client resistance, perceived cost, lack of expertise and knowledge of materials, limited materials selection and authenticity of suppliers, time to source materials, understanding of the impact of materials, accurate and accessible information and appropriate tools have all been nominated as barriers to the adoption of ESID (Hes, 2005; Davis, 2001; Kang and Guerin, 2009; Maté, 2006; Aye, 2003; Hankinson and Breytabace, 2012; Jones, 2008).

According to research undertaken by Maté (2009) cost was considered the biggest barrier for those who were not ready to take the responsibility for sustainable practice or who followed sustainable practice only where required, whilst the cost was not a significant barrier for those who were proactive in sustainable practice (Maté, 2009).

In Hankinson and Breytabace's (2012) study three concerns were raised when considering the specification of sustainable materials namely: the reliability of information from product suppliers and manufacturers e.g. green washing;¹ limited selection of environmentally responsible materials; and the need to rely on imported materials (with high embodied energy due to transportation) versus locally produced materials (Hankinson and Breytabace, 2012).

A survey conducted by Moussatche et al. (2002) showed that interior designers select materials primarily according to clients' preferences, needs, aesthetics and cost, not considering sustainability as a criterion. This research, in line with research undertaken by Kang and Guerin (2009), found that the efforts to gain knowledge about sustainable materials and products was considered too time consuming for the pressures of the designers' schedules. As a result fast and easy access to materials' data was considered an important factor in materials choice and those surveyed were found to heavily rely on manufacturers' literature because of its accessibility.

More specifically, Moussatche et al. (2002) found that functional factors, such as durability and maintenance were considered by participants in their study to be important criteria whilst global impact was commonly listed as secondary criteria. Health factors such as volatile organic compound (VOC) emissions, susceptibility to microbiological growth and long-term environmental impact were not a significant criterion for choosing materials (Moussatche et al., 2002). A similar outcome was recorded by Usal (2012) who looked at the role sustainability played in the choice of products amongst a group of interior design students. This study showed that although students perceived durability to be important, they were more concerned about trends and fashion than sustainability (Usal, 2012).

However, Maté's (2006) survey of designers in Sydney, Australia, found evidence that the designers' values were a greater determining factor when it came to selection of sustainable materials. Those who championed ESID displayed certain attributes and behaviours, which included questioning the authenticity of eco-materials. They were less likely to see cost as a barrier, and more likely to consider the importance of sustainable qualities in materials selection (Maté, 2006). In line with Maté's findings, Lee et al. (2013) found that interior designers with a positive attitude towards the adoption of sustainable materials led to their stronger behaviour contention to adopt such materials. The results suggest the importance of developing interior designers' positive environmental attitudes (Lee et al., 2013).

Cargo (2013) examined interior design practitioners' use of environmentally sustainable material selection

¹ With their fervour to market their products, some manufacturers have indulged in 'green washing' i.e. exaggerated the green or sustainable characteristics of their products; making it difficult for designers who want to practice ERID to see the 'wood for the trees', especially if they are not themselves immersed in ESID language (Jones, 2008).

databases. Although interior designers indicated that they place a high value on sustainability and felt a strong moral obligation to provide ESID spaces to clients, Cargo's research found that they were not acting on these due to lack of awareness of materials selection databases that help reduce the majority of the complexity from designing environmentally responsible schemes. Cargo (2013) suggests that a lack of motivation amongst interior designers to research new sustainable materials and products is causing the existing materials selection databases to be underutilised; barriers must be addressed in order to take full advantage of all sustainable materials and products offered (Cargo, 2013).

It is essential that product designers and manufacturers continue developing environmentally responsible products and broaden their product ranges, as with greater selection, designers and clients are more likely to choose this alternative. Also, designers need to continually ask product suppliers and manufacturers about their raw materials, processes and the origin of products (Hankinson and Breytabace, 2012).

The studies outlined above demonstrate the need for a greater focus to be placed on education and CPD for ESID for designers and clients alike; and in particular sustainable materials selection within design practices. ESID is beginning to become more prevalent within the field, but it is clear that challenges and barriers are preventing interior designer professionals from completely converting to this 'new' sustainable design practice (Cargo, 2013).

3. Research methodology

The aim of this research project was to first develop a comprehensive understanding of what constitutes a sustainable or green material choice and subsequently undertake a study to ascertain a snapshot of current supply of and demand for GSFT products for interior design practice.

Research was undertaken using four research methods:

1. Desk study of currently available GSFT materials;
2. Non-participant structured observation of accessibility of GSFT products;
3. Survey on the supply of GSFT materials to designers and public; and
4. Semi structured interviews with retailers.

1. A desk study was conducted to determine what materials are considered to be sustainable and green. It also allowed the researcher to categorise materials according to their application. This form of secondary research involved collecting data from existing resources. It provided a useful tool to support the primary research of the study, as well as being time and cost effective (Stewart and Kamins, 1993).

2. Non-participant structured observation within retail outlets ($n = 30$) that supply materials for interior design projects was undertaken in order to determine accessibility

of GSFT materials.² In this study a selected sample of retailers, who are based in a high profile design retail centre used by both designers and public, was considered more appropriate than a random sample because of the nature of the study i.e. to establish current supply of and demand for GSFT products (Naoum, 2013). As a result stores whose stock focussed on material sales (as opposed to e.g. lighting) were targeted. The final sample was $n = 30$ of a total of $n = 86$ retail outlets (35% of the total number of outlets).

3. A survey of the current availability of GSFT products was conducted in ($n = 30$) retail units that supply materials for interior design projects. The desk study results were used to categorise GSFT products for analysis. All stock was surveyed to establish whether or not there were any GSFT products for sale, and if so, what categories were represented.

4. Semi structured interviews with a mix of open and closed questions were conducted with retailers ($n = 30$) to determine their knowledge of GSFT materials as well as client demand for GSFT materials. Retailers were asked if they stocked GSFT products. If the answer was 'yes' they were asked to describe their attributes. If the answer was 'No' and they did stock GSFT items, they were shown the products and provided with an explanation as to why they were considered to be GSFT. If the answer was 'No' and they do not stock items, they were asked why not and what the barriers might be to stocking GSFT products.

They were also asked if customers ever ask for GSFT products; whether they believed there was a demand for GSFT; and whether they encouraged customers to purchase GSFT products (if they stocked them). They were asked if they thought the health benefits of using 'Green' products or the environmental benefits of using 'Sustainable' products were widely known. Finally they were asked what they believed the barriers to customers purchasing GSFT products were.

4. Results

4.1. Sustainable and green materials

The materials' uses being considered in this research project fall into five categories:

1. Fabrics;
2. Window treatments;
3. Surface materials;
4. Flooring; and
5. Walls and ceilings.

² Observation is an important aspect of action research and can be structured or unstructured, participant or not participant, over or covert. In this research a non-participant structured approach was adopted. This approach was adopted because it has been known to limit subjectivity and observer bias whilst enhancing validity and the overall reliability of the results (Hannon, 2006; Gerrish and Lacey, 2010 in R1; Merriam, 1998; Angrosino and Mays dePerez, 2000).

4.1.1. Fabrics

Research has revealed that it is necessary to consider the following when determining whether or not a fabric can be considered green or sustainable.

1. *Chemicals*: Is the fabric and its manufacturing process free of harmful chemicals: Any of 2000 chemicals can be used during the manufacturing process, leaving residual amounts in the fabric that can leach into the water supply, pollute the air, and be absorbed by human skin;
2. *Renewable*: Is it from a renewable source: If it is a synthetic fibre, is it 100% recyclable and made from recycled content material; or is it antique;
3. *Animal by-products*: Has the hide been purchased from a farm that is free range;
4. *Longevity*: How long will the fabric be useable before it shows signs of wear and needs to be replaced? The more durable a fabric is, the longer it will last, and a long-lasting fabric can be considered as more environmentally friendly than one that must be replaced frequently; and
5. *Biodegradable*: Is the fabric biodegradable, and if so is there an alternative option to becoming part of the waste stream at the end of its useful life.

Fabrics can be made from plant fibres, animal fibres, and synthetic fibres.

Green and sustainable plant fibres include:

- Organic cotton;
- Organic linen;
- Bamboo;
- Agave;
- Nettle;
- Hemp;
- Seacell;
- Soy fibre;
- Lyocell; and
- Bark cloth.

Green and sustainable animal fibres include:

- Wool;
- Cashmere;
- Alpaca;
- Camel hair;
- Leather; and
- Silk.

Although many synthetic fabrics are made from petroleum-based product, they can still be considered green. Some synthetic fabrics are spun from recycled pre- and post-consumer materials, like plastic bottles and waste from industrial production. This diverts waste from landfills and converts it into useful raw materials. Some of these recycled content fabrics are extremely durable. Even more

sustainable are fabrics created from recycled waste, which can be recycled into new raw materials when their lifespan is over. These types of synthetics are easily cleaned, fire resistant and contain recycled and recyclable content.

4.1.2. Window treatments

Window treatments are green by design as they help control the amount of heat gained and lost through windows. Their insulating and light blocking properties help to reduce heating and cooling energy loads. Window treatments may be made from:

- Fabric;
- Natural grass e.g. flax and hemp have a high resistance to ultraviolet rays;
- Bamboo, which has antimicrobial properties that makes it resistant to mould;
- Wood made from FSC timber in the form of blinds; and
- Composites made with 100% recyclable and renewable materials.

4.1.3. Surface materials

Selecting green and sustainable products makes a vast improvement on the effect surface materials have on environmental and human health. For example, the reduction or elimination of pollutants significantly improves air quality for both indoor and outdoor environments. This is especially important for people who suffer from Sick Building Syndrome.³

Examples include recycled glass. However, in order for recycling to make economic sense, designers will need to actively seek out and purchase materials made with recycled content. In addition, buying Fair Trade sustainable materials will ensure labourers are not exposed to toxins as well as reduce exploitation.

4.1.4. Flooring

Hard flooring can be made from the following:

- Wood: FSC wood, reclaimed wood;
- Fast growing and renewable materials: cork, bamboo, linoleum, recycled rubber;
- Natural stone;
- Tile or terrazzo: made from pre or post-consumer recycled content; and
- Finished in situ concrete.

Carpets can be made from wool, organic cotton, bamboo, hemp and jute, whilst their underlay can be made from recycled content. Carpet tiles can also be made from recycled content and it is possible to refurbish carpets.

³ Common to many buildings with Sick Building Syndrome (SBS) is the use of interior materials that have exposed the occupants to both chemical and microbial pollutants (McMullan, 2007).

4.1.5. Walls and ceilings

- **Paint:** non VOC paint e.g. water based and clay paints;
- **Tile:** recycled tiles come in glass, ceramic and porcelain and from recycled glass and pre-consumer industrial waste;
- **Plaster:** earth-based plasters are the healthiest wall finishes – natural clay plaster allows a wall to absorb and release moisture as needed;
- **Wall covers:** papers made from rapidly renewable sources like cork, grasses and other plant fibres, but must be used with an environmentally friendly glue or paste;
- **Faux stone:** manufactured using recycled water in the manufacturing process and sourcing local raw materials made with pre and post-consumer waste products; and
- **Wall panels:** made from eco-friendly materials – non-toxic recycled or rapidly renewable materials are all used (Dennis, 2010; Nayar, 2009; Howarth and Reid, 2000; Jones, 2008; Pilatowicz, 1995).

Databases of materials such as those found at <http://sustainablesources.com/resources/green-building-databases-design-resources/> can help with sourcing suitable products and materials.

4.2. Observation

Non-participant structured observation of each retail outlet ($n = 30$) was undertaken to determine the ease with which GSFT products could be identified from stock. Other than in the retail outlet that only sold Fair Trade goods, it was not easy to identify GSFT products. In some cases the retailer could not readily identify them either and in those instances the researcher had to explain what they were looking for. In particular when looking at fabric samples it was necessary to sort through a lot of stock, referring to the manufacturers' information, to determine whether or not the material could be considered GSFT. However a small number of retailers were confident identifying GSFT materials, highlighting their GSFT credentials to generate interest in the product.

4.3. Survey

A survey of ($n = 30$) suppliers of materials to designers and public established that 70% ($n = 21$) of suppliers stocked identifiable GSFT material products.

Examples of GSFT materials found included the following:

1. **Plant and animal fibres:** organic cotton, bamboo and hemp. Velvet, bamboo and cotton-blended fabrics, bamboo, arrowroot and sisal wall coverings, leather floor coverings;
2. **Synthetic fibres and recycled content:** recycled ceramic, porcelain and glass tiles; recycled polyesters, eco-vinyl and blended 'wool' made from recycled materials;

3. **Low VOC paints;**

4. **FSC and rapid renewables in floor covering,** wall coverings and fabric blends; and

5. **Fair Trade:** both retailers selling readily identifiable Fair Trade products were companies selling floor coverings.

Fig. 1 shows the frequency of materials categorised according to their application, with some suppliers offering more than one product, whilst Fig. 2 identifies their GSFT attributes, with some products exhibiting more than one GSFT attribute.

4.4. Semi structured interviews

Each of the retailers ($n = 30$) was asked whether or not they stocked GSFT products. 60% ($n = 18$) stated that they did and were able to identify particular products, whilst 30% ($n = 9$) did not stock any identifiable GSFT products.

10% ($n = 3$) did stock GSFT products but the retailers interviewed were unaware of this. As a result it was necessary for the researcher to provide an explanation and identify GSFT products stocked in their retail outlets.

When asked whether or not customers ever ask for GSFT products when they came into the store, 13% of retailers ($n = 4$) stated that they had been specifically asked to recommend GSFT products, whilst 67% ($n = 20$) could not recall being asked specifically about GSFT but may have been asked about a particular material that had GSFT properties, and 20% ($n = 6$) stated categorically that no one had ever inquired about GSFT products.

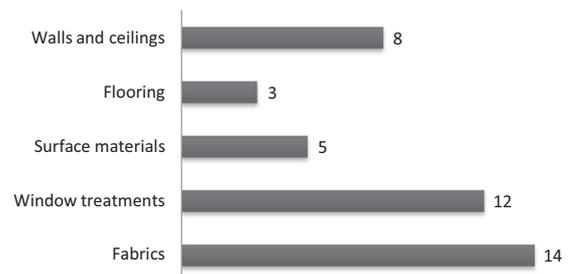


Fig. 1. GSFT application.

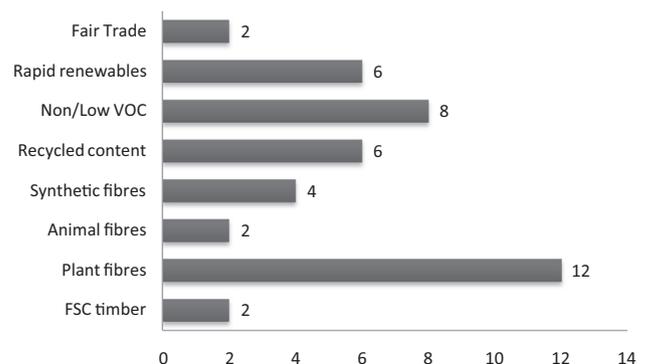


Fig. 2. GSFT attributes.

When asked whether or not they believe there is currently a demand for GSFT in the marketplace, 33% ($n = 10$) said 'yes', 17% said 'no' ($n = 5$) and 20% ($n = 6$) said 'not yet' stating that purchasers do not consider the provenance of the materials they chose and were unaware of issues such as VOCs.

Of the 70% ($n = 21$) stockists of GSFT, only 10% ($n = 3$) said that they would actively encourage customers to purchase GSFT products, with 53% ($n = 16$) saying no, and 7% ($n = 2$) saying that they may mention it depending on the situation and level of interaction with the client adding that "specifying green or sustainable materials is not straight forward" and "I rely on manufacturers' information".

Retailers do not believe the health benefits of using green products are widely known, with a resounding 93% ($n = 28$) saying no and 7% ($n = 2$) saying only in certain circles e.g. designers specifying materials for health and education facilities. When asked if they believe the environmental benefits of using sustainable products are widely known, 83% ($n = 25$) said no and 17% ($n = 5$) say yes, and in particular as a result of initiatives aimed at promoting awareness amongst the general public.

When asked to identify barriers to customers purchasing GSFT products, cost, lack of interest, limited materials selection and accessibility of information were all mentioned.

5. Discussion

The results of the desk study demonstrate the wide range of GSFT products that are currently in the marketplace (including fabrics, window treatments, surface materials, flooring, walls and ceilings) and indeed many of these materials and products could be sourced from the retail outlets surveyed for this research project.

However in the first instance it was not easy to establish which of the products were GSFT and frequently the researcher had to look through volumes of material, relying on personal knowledge and manufacturers' literature to determine the provenance of the materials marketed. Sourcing products in this way is inefficient and time consuming and has been highlighted as a barrier to engaging in ESID in the literature (e.g. [Moussatche et al., 2002](#); [Cargo, 2013](#)). Indeed [Kang and Guerin \(2009\)](#) found that the effort required to gain knowledge about sustainable materials and products was considered too time consuming for the pressures of designers' schedules.

Only a small number of the retailers interviewed actively encourage their customers to purchase GSFT materials and products. This research demonstrated that a majority of retailers do not have enough information on the provenance of materials to hand, and do not promote the benefits of GSFT products. This is in line with [Cargo's \(2013\)](#) research, which has demonstrated that whilst vendors and showrooms can offer data about their materials and products, this information is very basic and restricted.

The sole job of the vendor is to sell their product, so they are unlikely to tell a designer of the harmful or hazardous aspects of the material or product ([Cargo, 2013](#)).

This reluctance to promote GSFT may also reflect their belief that people are not aware of the benefits of either sustainable or green materials and therefore not engaged in ESID. If they perceived that there was a greater demand for GSFT products, the retailers may choose to promote these materials more effectively. This echoes [Moussatche et al. \(2002\)](#) research, which shows that materials selection is still driven by clients' preferences, needs, aesthetics and cost, not considering sustainability as a criterion.

[Maté \(2006\)](#) found evidence that those who championed ESID displayed certain attributes and behaviours, which included questioning the authenticity of GSFT materials. The fact that the retailers taking part in this study reported so few incidences where customers had requested GSFT products suggests one or both of the following are true:

- Designers and clients practising and promoting ESID are already using databases and or sourcing their materials and products from sustainability specialists rather than going to trade retailers, where they know the process will be more protracted and time consuming; or
- There is a significant sustainability gap, as coined by [Steig \(2006\)](#), where a disparity exists between the principles of ESID and the reality of practice. Despite having knowledge of sustainability, there is a lack of connection made by designers between their practice and the resulting environmental impacts of that practice ([Steig, 2006](#)).

6. Conclusions and recommendations

The paradigm shift from environmental irresponsibility to environmentally responsible design including ESID is challenging those who are responsible for the built environment; and as clients they are demanding sustainable solutions from their designers.

Research has shown that although designers' knowledge of ESID and interest in embracing it has grown, this has not necessarily to always translate into action, particularly where materials selection is concerned ([Maté, 2009](#)). There remains a gap between theory and practice coined 'the sustainability gap' ([Steig, 2006](#)).

As demonstrated in this research, GSFT fabrics, window treatments, surface materials, flooring, and walls and ceiling products are all readily available to enable ESID. The issue is how these materials are promoted for their green and sustainable credentials and how designers, and the public as a whole, source them. Better access to a basic knowledge of sustainability as well as more up-to-date information about sustainable materials will play a critical role in promoting sustainable practice ([Maté, 2009](#)).

However, as evidenced by the literature, even practitioners well grounded in the principles of ESID, lack adequate

information regarding the materials and products they specify (Steig, 2006). This research project confirmed just how difficult it is to find information on the provenance of materials, which could suggest the benefits of using databases for the sourcing and specification of sustainability products. By using third party sources such as environmentally sustainable material selection databases, interior designers could access greater information as well as a more diverse selection of materials and products to compare to one another (Cargo, 2013).

This would not however resolve the issue of improving the profile of GSFT materials and products in 'mainstream' retail outlets. Wider use of 'Eco-labels' and 'Green Stickers' for products could promote awareness and support voluntary adoption whilst increased legislation, regulation and the extension of green building certification schemes to include internal fit out would significantly impact on the specification and procurement of GSFT products.

Ultimately environmental sustainability requires a significant change in values, attributes and behaviours amongst interior designers (Mabogunje, 2004), which this research and the literature suggest the industry is yet to see.

Once these issues have been resolved, designers will be in a better position to meet the needs of their clients by creating green and sustainable indoor environments with the same ease as they do when they design using a 'traditional' approach, but with far reaching results.

References

- Angrosino, M.V., Mays dePerez, K.A., 2000. Rethinking observation: from method to context. In: Denzin, N.K., Lincoln, Y.S. (Eds.), *Handbook of Qualitative Research*, Second Edition. Sage, Thousand Oaks, California, pp. 673–702.
- Araji, M.T., Shakour, S.A., 2013. Realizing the environmental impact of soft materials: criteria for utilization and design specification. *Mater. Des.* 43 (2013), 560–571.
- Aye, E., 2003. Taking the pulse. Sustainability and the interior design practice. Available from: <http://www.greenbuildingservices.com/news/releases/2003_13_55_pulse.pdf> (Accessed: 20.09.2014).
- Bonda, P., Sosnowchick, K., 2007. *Sustainable Commercial Interiors*. John Wiley & Sons, Hoboken, New Jersey.
- California Integrated Waste Management Board, 2002. Green building materials. Available from: <<http://www.ciwmb.ca.gov/greenbuilding/materials/default.htm>> (Accessed: 20.09.2014).
- Cargo, A., 2013. An evaluation of the use of sustainable material databases within the interior design profession. Senior Capstone Project, University of Florida. Available from: <<http://www.honors.ufl.edu/apps/Thesis.aspx/Download/1993>> (Accessed: 20.09.2014).
- Davis, A., 2001. Barriers to building green. Available from: <http://www.architectureweek.com/2001/0822/environment_1-1.html> (Accessed: 20.09.2014).
- Dennis, L., 2010. *Green interior design*. Allworth Press, New York, NY.
- Fairtrade foundation, 2014. What is Fairtrade? Available from: <<http://www.fairtrade.org.uk/>> (Accessed: 03.11.2014).
- Fisk, W.J., Rosenfeld, A.H., 1997. Estimates of improved productivity and health from better indoor environments. *Indoor Air* 7 (3), 158–172.
- Gerrish, K., Lacey, A., 2010. *The Research Process in Nursing*, sixth Edition. Wiley-Blackwell, Oxford.
- Guerin, D., Ginthner, D., 1999. Designers knowledge of green design: what do we do now?. IDEC Int. Conf. Abstr. Clearwater, Florida, pp. 50–51.
- Hankinson, M., Breytabace, A., 2012. Barriers that impact on the implementation of sustainable design. Available from: <<http://cumulushelsinki2012.org/cumulushelsinki2012.org/wp-content/uploads/2012/05/Barriers-that-impact-on-the-implementation-of-sustainable-design.pdf>> (Accessed: 20.09.2014).
- Hannon, A., 2006. Observation techniques. Available from: <<http://www.edu.plymouth.ac.uk/resined/observation/obshome.htm>> (Accessed: 16.09.2014).
- Hes, D., 2005. Facilitating 'green' building: turning observation into practice. PhD dissertation, RMIT University, Melbourne, Australia.
- Howarth, P., Reid, A., 2000. *Allergy-Free Living: How to Create a Healthy, Allergy-Free Home and Lifestyle*. Octopus Publishing Group Limited, London.
- Jones, L., 2008. *Environmentally Responsible Design: Green and Sustainable Design for Interior Designers*. John Wiley & Sons Inc., New Jersey, Edited by L. Jones.
- Kang, M., Guerin, D.A., 2009. The characteristics of interior designers who practice environmentally sustainable interior design. *Environ. Behav.* 41 (2), 170–184.
- Kusumarini, Y., Ekasiwi, S.N.N., Faqih, M., 2011. Sustainable interior: a holistic approach of eco-socio-econo interior. *Aust. J. Basic Appl. Sci.* 5 (12), 2176–2181.
- Lee, E., Allen, A., Kim, B., 2013. Interior design practitioner motivations for specifying sustainable materials: applying the theory of planned behavior to residential design. *J. Inter. Des.* 38 (4), 1–16.
- Mabogunje, A.L., 2004. Framing the fundamental issues of sustainable development in Sub Saharan Africa. Center for international development at Harvard University (CID) Working paper No. 104, Cambridge, MA: Sustainable development program CID., 2004. Available from: <<http://www.cid.harvard.edu/cidwp/104.htm>> (Accessed: 20.09.2014).
- Maté, K.J., 2006. Champions, conformists and challengers: attitudes of interior designers as expressions of sustainability through material selection. In: Design research society international conference, Wonderground, 1–4 November 2006, Lisbon, Portugal.
- Maté, K.J., 2009. Attitudes versus actions: are interior designers genuinely embracing sustainable design through material selection? In: Proceedings from the fifth international conference of the association of architecture schools in Australasia, 4–5 September 2009, Wellington, New Zealand, pp. 1–9. ISBN 9780475123466.
- Mazarella, F., Lipner, J., 2011. Interior design. Whole building design guide: a program of the National Institute of Building Sciences. Available from: <http://www.wbdg.org/design/dd_interiorsgn.php>. (Accessed: 20.09.2014).
- McMullan, R., 2007. *Environmental Science in Building*, Sixth ed. Palgrave MacMillan, Basingstoke, Hampshire, UK.
- Merriam, S.B., 1998. *Qualitative Research and Case Study Applications in Education*. Joss-Bass Publishers, San Francisco.
- Moussatche, H., King, J., Roger, S.T., 2002. Material selection in interior design practice. Interior design educators council international conference abstracts, March 19–14, Santa Fe, NM, pp. 26–27.
- Naoum, D.G., 2013. *Dissertation Research and Writing for Construction Students*, third ed. Routledge, Abington, Oxford.
- Nayar, J., 2009. *Green Living by Design: the Practical Guide for Eco-Friendly Remodelling and Decorating*. Filipacchi Publishing, New York, NY.
- Pilatowicz, G., 1995. *Eco-Interiors: a Guide to Environmentally Conscious Interior Design*. John Wiley & Sons Inc, Houston, TX.
- Pile, J.F., 2003. *Interior Design*, third ed. Prentice Hall, Englewood Cliffs, New Jersey, ISBN: 10:0130991325.
- Steig, C., 2006. The sustainability gap. *J. Int. Des.* 32 (1), vii–xx.
- Stewart, D., Kamins, M., 1993. *Secondary Research: a Conceptual Approach*. Holt, Rinehart and Winston, New York, NY.

- Trelour, G., McCoubrie, A., Love, P.E.D., Iyer-Raniga, U., 1999. Embodied energy analysis of fixtures, fittings and furniture in office buildings. *Facilities* 17 (11), 403–409.
- Usal, S.S.Y., 2012. Evaluation of product consumption understandings of interior architecture students in terms of sustainability. *Procedia – Social Behav. Sci.* 47 (2012), 351–356.
- World Commission on Environment and Development, 1987. *Our Common Future*. Oxford University Press, Oxford.
- Yang, Y., Fenghu, W., Xiaodong, Z., 2011. Contrast study on interior design with low-carbon and traditional design. *ICMREE* 1 (2011), 806–809.