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Synopsis

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Course: BSc Architecture

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Synopsis

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Introduction

I am proposing a dissertation on smart materials and smart technologies, and their real-world application in the future of sustainable Architecture. The global emissions from the construction sector alone accounted for 37% of global operational and processes-related CO2 emissions in 2022 (Highfield, 2024). This therefore shows the need for development in the sustainability of the Architecture sector. It has also been suggested that integrating the Internet of Things with renewable energy sources can enhance the source's effectiveness and reliability (Green, 2024). However, most smart technologies are only in the development stage as to how these cutting-edge technologies can be implemented (ArchDaily, 2022). My dissertation aims to prove that smart materials such as piezoelectric flooring, photochromic glass, and smart battery systems are viable methods to achieve a needed development in the sustainability of the Architecture sector.

Main body

Methodology

In order to research this field, I will be exploring the available literature and conducting primary research within the field. This will be in a qualitative form due to the lack of statistics on the performance of smart materials and systems being integrated in this way. This research will come in different forms through interviews with manufacturers to understand the technology and processes behind the materials. I will also interview industry professionals to understand how these technologies could be integrated as a larger system. In addition, surveys will be sent to homeowners with these technologies already in place, and site visits will be key to observing these technologies already in situ.

Aim

The aim is to discover if any of these smart materials and technologies should be implemented to increase sustainability in an efficient way.

Objectives

My first objective is to evaluate the limitations of integrating smart materials, with the second being to assess how these can be integrated with smart systems. I will then conclude whether this integration is efficient and sustainable within the Architecture field.

Literature review

Current literature, such as *Rethinking the Future* and ArchDaily, suggests that whilst smart materials are expected to be a useful resource, they have not yet been widely researched or utilised within Architecture (Zaidi, 2025; ArchDaily, 2022). However, parametricarchitecture.com explains smart systems are widely used; however, there are integration limits (Parametric Architecture Editorial Team, 2025). This shows a gap in how these technologies and systems can work together and the best ways to do so.

Limitations

I will only have approximately eight months to complete this paper, and therefore, my scope of research is focused on specific areas, which are piezoelectric flooring, photochromic glass, and smart technologies, specifically energy storage. In order to provide an accurate and informative response, I will limit my scope of research to domestic dwellings.

Timeframe

This project will officially run from September 2026 to May 2027; however, I will be undertaking research before September 2026 in order to have an understanding of my field before commencing with my dissertation. Below is a Gantt chart setting out how I plan to commence with this dissertation.



Figure 1- Gantt chart (Batters, 2026)

Ethical Considerations

Due to undertaking primary research, there will be data protection measures in place, such as encrypting information stored on a locked device (University of Wales Trinity Saint David, 2025). This data will be deleted 6 months after the dissertation is submitted.

Conclusion

Based on the areas of research and time limitations, I have decided to conduct "An Investigation into the Integration of Smart Materials to Increase Sustainability in Contemporary UK Residential Architecture."

Word count: 535

References

- ArchDaily, 2022. *What Are the Smart Materials in Architecture?*. [Online]
Available at: <https://www.archdaily.com/982583/what-are-the-smart-materials-in-architecture>
[Accessed 28 April 2026].
- Batters, L., 2026. *Gantt Chart*. [Art].
- Green, A., 2024. *Smart Home Technology | Integrating IoT in Architectural Design*. [Online]
Available at: <https://a9architecture.co.uk/advice-centre/smart-home-technology-integrating-iot-in-architectural-design/>
[Accessed 28 April 2026].
- Highfield, A., 2024. *Architects have '196 times' more powerful to cut carbon through work than lifestyles*. [Online]
Available at: <https://www.architectsjournal.co.uk/news/architects-have-196-times-more-power-to-cut-carbon-through-work-than-lifestyles>
[Accessed 21 April 2026].
- Parametric Architecture Editorial Team, 2025. *The Hidden Brain of Architecture: What Architects Need to Know About Smart Building Operating Systems*. [Online]
Available at: https://parametric-architecture.com/what-architects-need-to-know-about-smart-building-operating-systems/?srsId=AfmBOopi2mHawhvMcggf_n7geIvlZyMTAl90rPMAk3M_wS-Q43dexC8e
[Accessed 30 April 2026].
- University of Wales Trinity Saint David, 2025. *UWTSD Group Data Protection Policy*. s.l.:s.n.

Zaidi, S. N., 2025. '*Smart Matirials*' - *The future of Architecture?*. [Online]

Available at: <https://www.re-thinkingthefuture.com/materials-construction/a3397-smart-materials-the-future-of-architecture/>

[Accessed 30 April 2026].