Developing Autonomous and Responsible Learners: A Hidden Perspective in First Year Design Studio

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The purpose of the design studio, which is the core of architectural education, is to educate the students to understand the nature of design, to think independently, to act in “designerly ways”, and to become “reflective practitioners”. The student must take on a new mode of learning, in which the main way to learn is by doing, and in which there is no one correct way to approach the design problem. The previous aspects associated with the studio — together with the open-ended, exploratory, and iterative nature of the design process — place the student at the center of the learning experience. Tutors in this context are facilitators of learning, rather than knowledge experts, and are expected to pay attention to the challenges that face students in adapting to this new learning environment and in assuming a new learner identity. Hence, this study employs longitudinal mixed approaches to uncover an emic perspective of the ways architecture students conceptualize learning in their first year and what distinguishes them from students in other disciplines.

INTRODUCTION

Several previous studies have explored particular aspects of design studios in some details (e.g., Schon, 1985; Fleming, 1998; and Craig & Zimring, 2000). Other studies have examined the social and epistemological implications of studio practices (e.g., Dutton, 1987; Heylighen et al, 1999, and Roberts et al, 2006), yet we have little research on autonomy in the context of studio-based subjects such as architecture. An understanding of learning autonomy in general is not sufficient. Rather, one must understand the teaching and learning requirements of one's own discipline to promote learning autonomy and responsibility most effectively.

Moreover, the first-year studio is of particular significance due to the challenges that face students in adapting to the new learning environment and in assuming a new learner identity. The first year plays a significant role in shaping students' attitudes and performances in subsequent years (Tinto 1993). It is typically the stage where students' expectations are reinforced or dispelled, ways of thinking established, and the foundations laid for the development of the autonomous learner. As such, the point of entry into university education represents a major event in the education of the individual and marks a transition that presents a variety of challenges to students.

Furthermore, students in architecture, deal with ill-defined (Reitman, 1965), ill-structured (Simon, 1973), and wicked (Rittel & Webber, 1973) problems, which generally grow more complex through the process of design. These design characteristics are often completely unknown to them when they arrive at architecture school, and even more challengingly, the problems are contrary to their experiences in their earlier education, which were mostly rule-based, procedurally driven, and based on well-defined problems with pre-defined strategies. This transition from the highly controlled, teacher-driven learning environment of schools to university, where the student is responsible for their own learning, is perhaps the biggest challenge of all for students (Murtagh, 2010). This is compounded by the students having little experience of design or other subjects that contribute to architectural study (Architecture Benchmark Statement, 2010). Students are thus confronted by a fundamental change to their principal mode of learning. Rather than acting as a recipient of knowledge, the student is required at an early stage to analyse problems and scenarios and construct knowledge pertinent to the specific context (Heylighen et al., 1999). Therefore, development of a personal knowledge is essential to create student's architectural identity, and consequently to learn to 'think as a designer'.

Additionally, in its annual survey of schools of architecture, the RIBA Education Statistics (2018) reported that there were more than 15,500 students in the UK's schools of architecture in the academic year 2016/2017, and numbers increased this year to more than 16,600. Courses in schools of architecture attracted more than 32,000 applications in the past academic year. Furthermore, more than 225,000 students are currently studying studio-based subjects, including design, and creative arts in UK universities (The Higher Education Student Statistics, 2018). With this increase in the number and percentage of students undertaking studio-based subjects, the current research is clearly vital — not only to architecture students, but also to the wider spectrum of learners in various studio-based programs. Accordingly, a study concerning students' reflections on their first-year experiences is necessary, providing a great opportunity for both learners and educators to develop their teaching and learning practices to ensure successful adaptation to studio-based learning and better facilitation of learning autonomy.

METHODOLOGY

In most recent studies, learning autonomy has been investigated in different ways. Some studies relied on quantifying it by asking participants filling a self-report questionnaires (e.g. Henri et al 2018, Scott, et al 2015), other studies made benefit of qualitative data such as participants' learning journals, diaries, interviews or open-ended questionnaires (e.g. Thomas et al 2015, Hamad 2018, McClean, 2009). Or through mixed method approaches (Brooman and Darwent 2012, Morris 2011, Xhaferi, and Xhaferi, 2011).

In our study, we aimed to provide useful insights from students' themselves about their evolving conceptions and expectations of learning in two approaches. To achieve this goal, we need no answer three main questions:

1 Do characteristics of maturity, and gender affect learning autonomy?
2 And in return, does autonomy have a positive effect on students' academic performance?
3 What are the key elements in design that support the development of autonomous learning?

Therefore, this research adopted a methodology that combines qualitative and quantitative methods. The rationale for mixing is that neither quantitative nor qualitative methods are sufficient by themselves to capture the trends and details of the problem in questions.

To answer the first two questions, and in order to gather data about the students' confidence of their autonomy, Paper-based questionnaires were completed by 34 students enrolled in BSc program within the Welsh School of Architecture at two time points (the beginning and the end of the academic year 2017/2018).

The Autonomous Learning Scale of Macaskill and Taylor (2010) was used as a quantitative research tool comprising of twelve questions and provides numeric value for students' learning autonomy level using a 5-point Likert scale. The ALS is a generic and not subject specific questionnaire and reported to have satisfactory concurrent validity and good internal reliability α = 0.78 (Brooman & Darwent, 2014). It is widely available and has been in many investigational studies.

Of the 34 participants 25 were female and 9 were male. All students provided information about their age at entry to university, of which 32 were 17—20 years old, and 2 were older than 21. Students' responses were coded that the higher the score on the ALS the more independent the student is, and statistical tests were carried out using the software package SPSS V25.0 (IBM).

DO CHARACTERISTICS OF MATURITY, AND GENDER AFFECT LEARNING AUTONOMY?

Students' responses were analyzed to determine whether any significant age differences were present. A Pearson correlation test was run to determine the relationship between level of independence and age.

		ALS Score	Age
ALS Score N = 34	Pearson Corelation	1	-.281
	sig. (2-tailed)	0	.108

Table 1: Correlation between ALS and Age

The correlation coefficient relating students' independence of learning to age is -281. The p- value (0.108) implies that there is no significant difference between the correlation coefficient and zero. Therefore, there is very little evidence of a relationship between age and autonomy of learning.

Moreover, a two independent sample T- test on the two means, with gender as the independent variable, suggested that there were no significant differences between the genders (The p-value, (Asymp. Sig. (2- tailed) is 0.749.)

		N	Mean	Std. Deviation
ALS Score	Male	9	46.22	4.23
	Female	25	45.44	4.25

Table 3: Group Statistics in terms of Gender

		f	sig.	t	Sig. (2-tailed)	Mean difference
ALS Score	Equal Variances assumed	.104	.749	.474	.639	.782
	Equal Variances not assumed			.475	.642	.782

Table 4: Relationship between ALS and Gender (Two Independent Sample T-test)

Does learning independence have a positive effect on students' academic performance?

A Pearson correlation coefficient was computed to assess the relationship between students' scores on the autonomous learning scale at the beginning of the year and their final marks in the design module at the end of the year. There was a positive correlation between the two variables, correlation coefficient (r) = 0.381, significant value p = 0.026.

Survey	N	Correlation coeficient	P-value
	34	.381	.026

Table 7: Correlation between ALS Score and Design Marks.

What are the key elements in design that support the development of independent learning?

In order to elaborate on the ALS findings and to gain a fuller understanding of the students ' learning experience, regarding their engagement with and transition onto the course, we carried out 5 waves of semi-structured interviews with 10 students during their fist years. The luxury of having face-to-face interaction with the students offered us the opportunity of gaining a clearer sense of their perspective on their first-year experience.

COMPLEXITY OF THE DESIGN PROCESS

In the design studio, students are usually tasked with researching a project site at the beginning of the year as part of their design project. They would then have to determine which resources to draw upon, critically evaluate what information they deemed relevant, and how to best represent their findings—ultimately requiring that each student defines the particular "design problem" for themselves. The same process happened for first year students in our study.

Students indicated that the open brief was the main motivator for their choice of what to design and learn, leading to a personal and meaningful learning experience. The open broad brief, and the fact that there is no singular correct answer for the design problem, encourages students to express themselves and their interests in the form of a proposed solution. This encouragement has a vital role in stimulating learning responsibility and autonomy by promoting students' confidence in their choices and learning abilities.

Students interpreted the brief in different ways reflecting how they experienced the site and their different interests. One student reflected on this by giving an example on how she approached the design problem:

"I liked how houses in Lanzarote combine water and trees in the inside. So, I thought of using that for my space. To create a space where you can sit to watch the solar eclipse which I've been studying, and to be surrounded by water and trees, this way people can feel connected more to earth."

Another one explained:

"They wanted us to do spatial expressions that represent architecture. It was challenging and very abstract; the brief was vague and accordingly everyone has a different thing to do. Basically, I was very interested in the rocks of Lanzarote and I wanted to mirror their colour and texture in my models, so my project became a kind of a museum of rocks."

The broad design brief, accordingly, engages the students in complex processes of research into different variables, such as precedents, site, context, and so on, which helps them to interpret the design problem in various ways. In this way, students are able to go beyond the brief requirements and formulate their learning needs and objectives at a very early stage. As they develop their initial proposals and produce new ones, they come to accept responsibility for their learning and

the decisions that they make. Thus, the broad nature of the brief is a positive factor which makes the students co-producers in the learning process.

THE CULTURE OF FEEDBACK

Students also talked about the feedback they received during the year especially at crits. The UK's Quality Assurance Agency's standards for architecture (QAA, 2000) refer to crits as an integral teaching strategy that prepares students for professional practice. It is the principal method of feedback and assessment for design modules in architectural education (Parnell et al., 2007, McClean & Hourigan, 2013). Most of the students quickly recognised this — even during their first project — and recorded valuing the opinion of 'fresh eyes' on their work as well as the alternative design approaches suggested by critics.

A student compared the feedback students receive in architecture school with what they used to have during their secondary education or high school, by saying:

"In school I had similar things like oral exams, but they weren't the same because they didn't give feedback, just asking you a question or two. But here with crits there was definitely a lot of feedback."

Another student compared the feedback in architecture school with other disciplines:

"And one of my flat mates couldn't believe that I'm working all the time and I don't mind that. But I told her that for me it is different because my work has immediate results; I can see my product and I get feedback and learn fast, for her she has to study for six years and then hope that she has learnt it."

The positive attributes of the crit can be easily identified from students' narratives. For example, feedback is sufficient and applicable for their projects and students were able to use it to develop their learning. Students' comments on their crits were:

"It was more like a discussion with feedback; they weren't critical but made suggestions to make it stronger."

Unexpectedly, students perceived the diversity of opinions expressed during the crits in a positive manner; different and sometimes contradictory comments during the crit were seen as a positive aspect that provides richness to the learning process. Blythman et al. (2007) suggest that students seeing

tutors having contradictory positions and disagreements in crits is important as it demonstrates that there is more than one solution to a given brief. However, Smith (2011) explains that as the purpose of the crit is to provide feedback that contributes to learning, students should not be left confused by such differences of opinion and should finish the session with clear strategies to progress their work. Students in this study grasped this and commented:

"It's quite interesting to know what other people think about your work because sometimes they can tell you interesting information as they have different perspectives… it's very interesting."

Students easily picked up these advantages of the crit, and they actually preferred the process to having exams like other disciplines:

"I prefer crits over exams; I don't just learn how to improve my work, but I also learn from other students' projects and I learn when critics give feedback to them; it teaches you and even when it is negative, it's constructive."

However, the following comment reveals how some students perceive the crit as an assessment point in which the focus is on the mark and not the feedback. This misunderstanding of the purpose of the crit might result in reducing students' learning and undervalue the knowledge they gained during the year:

"My tutor said my work has improved but the mark is still the same, which means that I can't improve things or maybe I'm not capable, maybe I'm not good."

This might be related to the fact that some students, at their first year in architecture school, are likely to maintain previous learning habits and beliefs accumulated at school.

While the previous quote illustrate how students still put more emphasis on exam results, or in this case on the crit marks, just as they would in secondary school, some other students were able to realise the importance of self-improvement, and not marks, as a real reflection of their learning:

"I don't think grades are very important. The important thing is self-improvement and motivation; it's also important to work externally from the university and not just depend on it."

Another students commented:

"I'm proud of myself but the grades aren't the same as I used to get in high school. In high school I was used to getting high grades; here I got a whole range of grades...But it's fine, I don't mind it, I always try to do my best and that's it."

It could be argued then, that getting constant feedback and adjusting to different points of view is part of the transition from secondary to higher education, and what distinguish architecture from other disciplines.

PEERS LEARNING

The students talked about becoming 'like a family' and 'being on a journey' over the year, supporting each other as autonomous learners and social beings and acknowledging their diverse approaches and skill levels. Students perceived the benefits of working in the studio together, and they reported that the informal teaching from one another was personally and academically valuable and made them more active:

"We help each other. My relationship with my course mates is important for the course and for my wellbeing".

During the year, the students confirmed this association between working around others in the studio and learning development. One student talked about how working with — and around — others motivated her to work more, which positively affected her learning:

"I prefer working from home, but now I spent a lot of my time in the studio and I feel like my design is getting better because I'm getting other students' opinion, I ask them for advice a lot, especially when it comes to drawing techniques."

Students' narratives corroborate the findings of a great deal of the previous work in this area. Chickering and Gamson (1987) suggest that collaboration with other students is a major contributor to success in education. They explain that good learning is collaborative and social, not competitive and isolated, and that working with others often increases learning engagement. Peer relationships are not limited on providing social support, with students talking about gaining further insights into their own work by reflecting on how their peers approached similar problems, which clearly identifies peer dialogue as a form of feedback. One student commented on this:

"You just go through others doing their work, and you go to your friend and tell them "I need to sort this issue, do you

have any suggestions" or do you like my model, or you just share your ideas."

As explained previously, each student in the design studio deals with open-ended problems in their own way. Through analysis of students' narratives, it is clear that students learned various skills such as drawing, model-making, and digital drawing from one another, realising and appreciating their different skill levels and the power of background diversity. It can be argued that student collaborations, whether for social or academic support, foster learning autonomy as they expose the students to a diversity of viewpoints, which enhances their self-awareness and self-critique. This confirms the conclusions of Thompson (2017), who suggests that the design studio supports a sense of belonging among students and that this feeling has a significant impact on the shaping of students' architectural identities.

LEARNING ENGAGEMENT OUTSIDE THE DESIGN STUDIO

However, autonomy, as a vital aspect of learning, is not limited to the time and energy that students invest in educationally purposeful activities, but also reflects the efforts made by institutions to employ effective educational practices (Kuh et al., 2008). While the previous quotes illustrate how learning enjoyment affects students' engagement, examples of engagement outside the studio and how they contribute to learning autonomy were also cited.

The first example was a field trip that students had undertaken between their design projects. This was an important feature that promoted engagement and motivated the students to work on their designs. They appreciated this educational strategy for gaining more architectural knowledge through exposure to different architectural styles and being given the chance to explore and experience the site from various points of view, something which could not be experienced through books or lectures and tutorials. The UK Quality Assurance Agency's Standards for Architecture (2010) recommend study visits in the UK and Europe as an invaluable opportunity to experience a wide range of architecture and diverse cultural contexts.

The study trip was an opportunity for the students to see the site of their upcoming project, to comprehend its natural and cultural context, to reflect on it, and to be critical. This unique strategy allowed the students to develop their drawing and observation skills and to see and record what could be of interest in their design proposals, without being told directly what to do, thus increasing their sense of independence. In

this way, site visits and field trips enrich individual references, with consequences for future design projects in a non-formal or traditional way. A student commented on this:

"*It was very beautiful. I learned a lot about the island, and al lot of students were inspired especially when we went to Cezar Manrique's house which was designed within a series of volcanic bubbles and that was quite cool. It wouldn't be the same if we just looked at pictures of the island instead of going there."*

In addition to their educational importance, site visits have a positive role in engaging students in their learning. Field trips in many disciplines (landscape architecture, art, geography, sociology, tourism and hospitality, etc.) are fundamental to the acquisition of visual, cultural, and theoretical knowledge outside the traditional classroom (Freire, 2011; Do, 2006; Krakowka, 2012; Scarce, 1997).

Moreover, students reflected on the field trip experience as bringing them closer to their tutors and thus creating a more supportive learning environment. Accordingly, the study trip can be seen as a useful educational tool for enhancing learning experience and engagement outside the design studio. In our research, the field trip benefited social interaction, as the students spent several days together, researching the site and socialising with locals and each other. They were engaged and entertained by the field trip, which made the educational experience more enjoyable, effective, and meaningful and resulted in an increased motivation to learn.

DISCUSSION OF FINDINGS

The results of the ALS survey did not show any significant differences among students' gender. We found no effect of student maturity on their level of learning autonomy; students (aged over 20 at the start of their program) do not perceive themselves as more autonomous than other students, however, the numbers of students who aged over 21 was only 2, which means that sample size was too small in order to test it any meaningful way.

We also questioned whether there was a significant correlation between students' overall marks in their first year and their scores on the autonomous learning scale. Previous studies have connected autonomy to success and better learning (Hamad 2018, Derrick, Ponton & Carr, 2005, Mattarima and Hamad 2011). In this research, the students' marks in their design module were used to test if there was a significant correlation between students' academic performance and their autonomy.

Students' design marks are considered a reflection of their learning, representing a balanced view of their performance over the year which assessed by a range of different staff to compensate any bias (Roberts 2004). The results of the survey described that the students who had higher scores on ALS than others, had gained higher marks at the end of the year. These results are consistent with those of previous studies and suggest that higher learning autonomy level promotes higher academic performance.

Furthermore, students' narratives have important implications for understanding how the design studio positively contributes to learning autonomy and responsibility. One of the central cognitive demands placed upon architecture students is engagement with the uncertainty inherent in design problems (Cross, 2011; Nelson and Stolterman, 2012; Lawson, 2006.) Design problems are ill-defined and ill-structured, and accordingly it is common that students may experience a status of being lost and uncertain. This uniqueness of the design problems in addition to lack of architectural knowledge may confuse students over the nature of the actions they must take and therefore they feel unsupported. This can be seen as an opportunity for them to move towards greater understanding of the self as a learner of design.

Moreover, engagement in learning — both inside and outside the design studio — leads to better learning experiences; and accordingly, the more engaged student is, the more independence and success can be expected. This confirms the previous research in this area that links engagement with effective learning. Knowles (1975) confirms that when students actively engage with their own learning, this increases learning effectiveness. Similarly, Dickinson (1995) explains that an active role in learning is linked to learning autonomy, as it leads to more effective learning. Finally, one recent study highlighted the importance of interest in promoting students' motivation to learn and its positive impact on active engagement in the learning process (Kahu et al., 2017).

This study also demonstrates that students are able to learn from different sources, including their peers and 'upper years', recalling the notion of 'relevant others' in Kesten's (1987) definition of the independent learner. The development of skills such as drawing techniques and digital drawing and modelling was a key outcome of informal learning in the design studio. Another outcome of students work side-by side was the identification of peer dialogue as a form of informal feedback that positively contributes to learning. This evidence of peer learning contradicts previous research findings that suggests students do not utilise each other as resources in the design studio (Argyris, 1981; Dutton, 1987).

Expanding on the previous point, the study also highlights the role of peers in facilitating students' transition into autonomy, recalling the concept of 'zones of proximal development' in Vygot-

sky's (1978) theory of learning. Students were able to develop skills to complete tasks by themselves, which they could not have accomplished at the beginning of the year. With the help of others, students not only learned how to complete these tasks, they also achieved them on their own and were able to share this knowledge with other students. This collaboration and willingness to share and transfer knowledge and skills is essential for promoting independence and shifting the focus away from the tutor as the only source of knowledge, moving towards a student-centred environment. From a constructivist perspective, students in this case would be seen as the active constructors of knowledge within the design studio setting (that includes both the physical context and the social interactions within it), and not just passive absorbers of knowledge.

In summary, students praised the different methods of learning in the design studio and the different experiences they had throughout the year, such as the field trip, which was seen as both academically and personally beneficial. They also enjoyed different aspects of the design process. In their approach to design, students did not limit themselves to hand drawings; rather, they used a combination of model making and computer modelling, which they learned informally from peers and the upper years. Students described how much they enjoyed their first year at architecture school, noting that they had acquired a variety of skills by the end of the year — despite not being entirely satisfied with their learning in some cases, or finding some of the learning aspects challenging. Both motivation and enjoyment promoted learning engagement and ownership, which led to learning responsibility. The students also positively compared learning in the studio context to the traditional method in high school and other higher education disciplines. This suggests that the design studio is positive environment for facilitating learning autonomy in higher education.

The students also showed evidence of positive change in their behaviour during crits as the year progressed, with growing confidence in their ability to express a more personal view. This indicates that their understanding of learning had developed over time, and it may also be attributable to various growing skills in practical knowledge (e.g., new digital drawing software).

Despite their growth through learning directly from their peers, students still expected these skills to be taught primarily by their tutors. Thus, while students must identify their own learning needs, it is also the responsibility of the university to recognise their needs and make provisions to meet them (Hodgkinson,1994). We should seek to provide broad knowledge to our students to create a learning environment in which they are encouraged to think critically and take on difficulties in

their learning. We must also understand our role as facilitators of independence, rather than knowledge experts, thus changing our traditional role of full supervision into one in which we share guidance and responsibility.

However, this should not be understood as an invitation to withdraw or neglect our role in the learning process; rather, we should gradually minimise the provision of guidance, to the point at which students have equal power over — and full responsibility for — their own learning. In this way, we can become more effective and efficient in fostering learning autonomy among our students, and students more motivated and better able to discover and accomplish their own learning needs and objectives.

In simple terms, facilitating learning autonomy, whether in the design studio or in any other learning setting, requires the formulation of more inclusive pedagogic strategies that explicitly accommodate students' diversity and individuality. It is also vital to address and identify shortcomings in our teaching practices and value the views of the student body.

LIMITATIONS OF THE RESEARCH

The current study has examined the experiences of first-year students in one architecture school in the UK, with a modest sample size comprises students who achieved high grades in their A-levels, with an imbalanced gender ratio. Accordingly, the generalizability of these results is subject to certain limitations. A follow-up research with the same students towards the end of their 3rd year might provide further insight into the long-term experience of learning autonomy in the design studio and how it develops and in what rates.

BIBLIOGRAPHY

Argyris, C. (1981). *Teaching and learning in design settings.* Architecture education study, 1, 551–660

Blythman, M., Orr, S., & Blair, B. (2007). *Critiquing the crit*. Brighton: Art, Design and Media Subject.

Brooman, S., & Darwent, S. (2012). A positive view of first-year undergraduate reflective diaries: Focusing on what students can do. *Reflective Practice*, 13(4), 517–531.

Brooman, S., & Darwent, S. (2014). Measuring the beginning: a quantitative study of the transition to higher education. *Studies in Higher Education,* 39(9), 1523–1541.

Chickering, A. W., & Gamson, Z. F. (1987). Seven principles for good practice in undergraduate education. *AAHE bulletin*, 3, 7.

Craig, D. L., &Zimring, C. (2000). Supporting collaborative design groups as design communities. *Design Studies*, 21(2), 187–204.

Cross, N. (2011). *Design thinking: Understanding how designers think and work.* Berg.

Derrick, M. G., Ponton, M. K., &Carr, P. B. (2005). A preliminary analysis of learner autonomy in online and face-to-face settings. *International Journal of Self-directed Learning*, 2(1), 62–71.

Dickinson, L. (1995). Autonomy and motivation a literature review. *System*, 23(2), 165–174.

Do, K. (2006). *Experiential education: Beyond the classroom. In Proceedings of the Evaluations and Assessment: Enhancing Student Learning.* Perth, Australia: Curtin University of Technology.

Dutton, T. A. (1987). Design and studio pedagogy. *Journal of architectural education,* 41(1), 16–25.

Freire, M. (2011). *Towards a different approach in teaching landscape design* (Doctoral dissertation, PhD thesis, University of Évora, Portugal).

Fleming, D. (1998). Design talk: Constructing the object in studio conversations. *Design issues*, 14(2), 41–62.

Hamad, K. A. (2018). *Understanding the Situation of Learner Autonomy within the Context of Higher Education in Kurdistan-Iraq.*

Henri, D. C., Morrell, L. J., &Scott, G. W. (2018). Student perceptions of their autonomy at University. *Higher Education*, 75(3), 507–516.

Heylighen, A., Bouwen, J. E., & Neuckermans, H. (1999). Walking on a thin line— Between passive knowledge and active knowing of components and concepts in architectural design. *Design Studies,* 20(2), 211–235.

Hodgkinson, K. (1994). Course guides for flexible learning. *Flexible learning in higher education,* 57–67.

Kahu, E., Nelson, K., & Picton, C. (2017). Student interest as a key driver of engagement for first year students. *Student Success,* 8(2), 55–66.

Kesten, C. (1987). *Independent Learning: A Common Essential Learning.* A StudyCompleted for the Saskatchewan Department of Education Core Curriculum Investigation Project.

Knowles, M. S. (1988). Preface. In: Boud, D., ed. *Developing student autonomy in learning.* Routledge.

Krakowka, A. R. (2012). *Field trips as valuable learning experiences in geography courses.* Journal of Geography, 111(6), 236–244.

Kuh, G. D., Cruce, T. M., Shoup, R., Kinzie, J., & Gonyea, R. M. (2008). Unmasking the effects of student engagement on first-year college grades and persistence. *The journal of higher education,* 79(5), 540–563.

Lawson, B. (2006). *How designers think.* Routledge.

Macaskill, A., & Taylor, E. (2010). *The development of a brief measure of learner autonomy in university students.* Studies in Higher Education, 35(3), 351–359.

Mattarima, K., & Hamdan, A. R. (2011). Learner's motivation and learning strategies in English foreign language (EFI) in Indonesian context. *Journal of Edupres*, 1, 100–108.

McClean, D., & Hourigan, N. (2013). Critical Dialogue in Architecture Studio: Peer Interaction and Feedback. *Journal for Education in the Built Environment*, 8(1), 35–57.

McClean, D. (2009). *Embedding learner independence in architecture education: reconsidering design studio pedagogy.* Robert Gordon University, PhD thesis

Morris, R. M. (2011). *An Exploration of The Barriers To Independent Study and Learning In First Year Undergraduate Engineering Students.* Masters Thesis, TU Dublin

Murtagh, L. (2010). They give us homework! Transition to higher education: the case of initial teacher training. *Journal of Further and Higher Education,* 34(3), 405–418.

Parnell, R., Sara, R., Doidge, C., & Parsons, M. L. (2007). *The Crit: An architecture student's handbook.* Routledge.

Reitman, W. R. (1965). *Cognition and thought: an information processing approach.* Wiley

Rittel, H. W., & Webber, M. M. (1973). Dilemmas in a general theory of planning. *Policy sciences,* 4(2), 155–169.

Roberts, A., Pearce, M., Lieberman, O., & Matzica, W. (2006). The Development of Values in the Studio: A Hidden Curriculum?. *Changing Trends in Architectural Design Education,* 469.

Roberts, A. S. (2004). *Relationship between cognitive style and a student's performance in architectural design education.* PhD Thesis, Cardiff University.

Scarce, R. (1997). Field trips as short-term experiential education. *Teaching Sociology,* 25(3), 219–226.

Schön, D. A. (1985). *The design studio: An exploration of its traditions and potentials.* International Specialized Book Service Incorporated.

Scott, G. W., Furnell, J., Murphy, C. M., & Goulder, R. (2015). Teacher and student perceptions of the development of learner autonomy; a case study in the biological sciences. *Studies in Higher Education,* 40(6), 945–956.

Simon, H. A. (1973). The structure of ill structured problems. *Artificial intelligence,* 4(3–4), 181–201.

Smith, C. (2011). Understanding Students' Views of the Crit Assessment. *Journal for Education in the Built Environment,* 6(1), 44–67.

Subject Benchmark Statement Architecture (2010), QAA, Higher Education Academy, UK.

Tinto, V. (1993). *Leaving College: Rethinking the Causes and Cures of Student Attrition.* University of Chicago Press

Thomas, L., Jones, R., & Ottaway, J. (2015). *Effective practice in the design of directed independent learning opportunities.* York: Higher Education Academy and the Quality Assurance Agency.

Thompson, J. (2017). *Becoming an Architect: Narratives of Architectural Education,* PhD dissertation

Thornbury, S. (Ed.). (2000). *Learner autonomy: A guide to developing learner responsibility.* Cambridge: Cambridge University Press.

Vygotsky, L. (1978). *Social development theory.* Instructional Design.

Xhaferi, B., &Xhaferi, G. (2011). *Developing learner autonomy in higher education in Macedonia.* Procedia-Social and Behavioral Sciences, 11, 150–154.