

# Beyond the Build: Building, Reflecting, Learning... and Repeat

Tools are down, the dust has settled, and congratulations have been given. Objects are in new homes... What now? What does/did it mean? The question explored in this study is what is the educational potential for continuity beyond completion of an object.

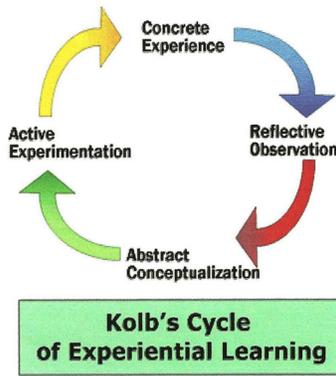
The significance of building in the first instance needs examining. Then, the potential for continuation, and future outward ripples of learning, should be analyzed. What do the students learn, how do they learn, and can this help future students? What can the significance of other participants, eg. clients/users/tutors, be? This study examines the motivational factors, and the resultant learning, associated with student live build projects. Also, it considers whether this sort of 'real project' assists learning, in a way that traditional academic learning does not.

At the beginning of the 2013-2014 year, I set my year two Oxford Brookes University architecture students a building task, and put them into 15 build groups. This was a new introduction to the technology course, to build small-scale community projects for real clients in Oxford. I participated in such a project when I was a student, at Dalhousie, Canada. Looking back, I found that it was one of the most memorable parts of my education. Since then, I ran Design-Build projects at both Dalhousie, and the University of East London, UK, before implementing them at Oxford Brookes, UK. As of 23 Sept. 2014, we started the second year of live build projects (for the 2014-15 year). They will complete late October 2014. Many of the clients from last year have commissioned projects this year, enabling a new round of learning, allowing continuation.

To understand the impact and potential of this teaching and learning I have examined the results and feedback from the projects, in the context of relevant educational literature and approaches. I have utilized feedback (student/client/tutor) from the 2013-14 year, and also client post occupancy feedback a year on (September 2014). The sample whilst small, has provided useful insight. I have also had the benefit of input from Tom Cox, a specialist completing a Master's in Social Sculpture, who project manages art commissions for local hospitals and was also client to a couple of student projects.

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To set the scene, I will outline the student tasks. Then I will discuss the following educational considerations and methods: reflective learning, motivation in learning, and authentic learning.

### 1. OUTLINE OF THE LIVE BUILD PROJECT

Clients in 2013-14 included an art charity, campus catering, and allotments on and off campus. Designs included seating, a market stall, a catering cart, privacy screens, planters, and cold frames. Students managed small budgets, purchased materials and built. Projects were generally eco- and budget friendly.

It was an intense period of designing, collaborating, and making. Students groups did a two-day charette. They then devised how procure materials and build. They had one month to complete. During this time there was a series of lectures and workshops on materials, and they met with tutors once per week to discuss progress and troubleshoot. Two meetings with structural engineers were programmed, to ensure build stability - paralleling real practice consultant meetings. At the end of the assignment, students presented to the class. The better ones noted how they might do things differently in the future, and discussed process, problems and solutions.

### 2. REFLECTIVE LEARNING

#### 2.1 DEFINITION AND DISCUSSION OF REFLECTIVE LEARNING

The design process for Design-Build is similar to that of craft, as observed by Adamson (2007, p4), 'It is a way of doing things, not a classification of objects, institutions, or people.' Context is an important element of the work and informs what is produced. The reflective dialogue within group collaboration is perhaps the most important outcome but this is hard to teach, it needs to be experienced. It is a 'lived experience'.

In addition to learning from doing and from collaborating, the object itself (and associated results) can be a source for study. Drawing upon the material culture based research of Maudlin and Vellinga (2014, p1) one can '...[examine] the lives of buildings after 'completion', not as examples of decay through use, but as [an] ongoing and formative process of consumption.' Not only the material and construction can be studied, but the subsequent use. This can be a source of reflection for a student, and also students not involved with the builds. It can be part of a longer term study once handed over to the client –as will be discussed below.

How can students learn through reflecting on practice? At least three areas of focus are possible, linked to both process and material: what students learn as they build, what they learn upon reviewing objects, and what others can learn from the objects –even if not involved in the original making. According to Moon, reflective learning is when we reflect on what we have already learned:

Reflection/reflective learning is a form of mental processing - like a form of thinking - that we may use to fulfil a purpose or to achieve some anticipated outcome or we may simply 'be reflective' and then an outcome can be unexpected. Reflection is applied to relatively complicated, ill structured ideas for which there is not an obvious solution and is largely based on the further processing of knowledge and understanding that we already possess. (2004, p8)

To understand the relevance and potential of reflective learning, it helps to first clarify two types or approaches to learning: deep and surface. These different approaches affect the impact and quality of learning. Deep learning is where the learner intends to understand the meaning of the subject. Surface learning is as described: it is superficial and is required only for a short time, for example until the end of a course or an exam. This is where a learner will 'just get the knowledge

Figure 1: Kolb's Cycle (from Regis).

into their head' (Moon, 2004, p6). Moon posits that a deep approach engages some reflective activity.

She states that the Kolb model of learning is successful because it emphasizes the role of reflection, see diagram, figure 1. To summarize, to complete a learning cycle the learner will have a Concrete Experience (Outcome), then there is a period of Reflective Observation, this is followed by explanation in the form of Abstract Conceptualization of what is learned, there can then be Active Experimentation. This cycle can then repeat, ever deepening and broadening learning. It requires the learner to represent their learning (eg. in an action) and then learn from the process of representing this learning. (From Moon 2004, p8)

Experience of live projects fits this model, which can cycle a few times. Students start with a sketch design to meet the brief (Concrete Experience), then review how this could be built (Reflective Observation), come up with different possibilities (Abstract Conceptualization) and test some ideas at a larger scale (Active Experimentation). They might go through a few cycles, and focus on different aspects of their design (eg. to make it structurally stable, or to make it ergonomic etc.). This sort of learning is applicable to architecture, but also found in other disciplines, from which architecture students may benefit.

## **2.2 REFLECTION IN SOCIAL SCULPTURE AND PHENOMENOLOGY**

Two of the live projects of the 2013-14 session had a client, Tom Cox, who was completing an MA in social sculpture. Some approaches of this discipline are relevant to Design-Builds. Briefly, social sculpture is part of art practice:

The term 'social sculpture' was coined by Joseph Beuys in the mid-1970s to describe his 'expanded conception of art' in which every human being is an artist called upon and capable of shaping a humane and ecologically viable society (Sacks)

Social Sculpture is multi-disciplinary, linking together many different individuals and fields of study. The key to it is transformation, where, through a reflective process, art, objects, ideas, politics, buildings, materials.... (etc.), have the power to transform. What social sculpture can do is create a 'space' in the world for participants to recognize the potential in these things. The space begins in the 'inner' world; social sculpture values the use of imagination to effect change in the world. Through teaching, reflection and dialogue; seminars, research, events and exhibitions social sculpture enables new modes of understanding (Cox, 2014)

According to correspondence with Cox, much thinking in Social Sculpture comes from phenomenology and studying one's own experience of the world:

Our problem is that we where we begin is already downstream, and in our attempt to understand where we are we only go further downstream.

What we have to do instead is learn how to go back up stream and flow down to where we are already, so that we can recognise this is not the beginning but the end.

That is phenomenology! (Bortoft, 2012)

He explains Social Sculpture at Oxford Brookes is part of an interdisciplinary program teaching strategies for students to connect with world and 'become present'. Reflective practice is encouraged whatever their discipline (music, composition, fine art or social sculpture). The reflection he describes is useful to Design-Build.

The social sculpture course begins with students working on small scale art projects –not unlike the architecture students. They explore working practices, both in groups and individually, developing reflective practice. Each project is presented and receives comments via a feedback sessions, in place of a traditional critique. The

structure allows students to learn what the group has experienced through their work. Direct questions of makers are discouraged. Instead students and tutors are encouraged to make statements about how the work made them feel. At the end, makers are able to reflect on feedback and add their own thoughts. (Cox, 2014)

Throughout the course reflection is encouraged: in dialogue, notebooks, sketch-books, walking, reading, etc... This reflective phenomenological process can be rewarding: according to Cox starting a reflective practice can be difficult, but... 'Once you have experienced reflective learning it becomes an instinctive natural way to work' (2014). Resembling the Kolb model, the process for social sculpture students was repeated. By repetition, students can become more confident, see patterns emerge, try out different approaches, and learn deeply.

Such reflection and sharing could be influential for architectural live projects. More focus on consumption of the builds (post handover), and user experience could lead to more reflective practice. During both the development, and the final presentation stage, reflective practice may also be possible. According to Cox's feedback as a client:

Group discussion and reflection would also help the students. The few presentations I saw were basically the students talking about what they had done and how they went about doing it. A more interesting discussion would be to present the final works and have other student talk about how they experience the piece of work.

In post occupancy feedback, incorporation of a student reflection mechanism would be useful as a learning process. Cox suggested there be a student-client meeting after handover: 'This would help the reflective process and help the understanding of the client designer relationship.' The benefit of social sculpture influenced reflection, of both potential and actual experience, would allow students opportunity to deepen their learning, and create projects that are sensitive to, and even exceed user requirements.

### **2.3 GRADUATED SCENARIOS**

The graduated scenario is a technique developed by Moon (2009), is helpful for students to understand what it is to be reflective. She states this method promotes understanding of reflective learning, hard to teach in other ways. It can also be useful to teaching staff for improving or creation of learning outcomes, eg. for evaluating personal learning.

Her technique is as follows: 1) She wrote 4 pieces of creative writing, starting with mostly descriptive, and getting progressively more reflective, 2) She identified what changed as it got deeper, 3) From this a framework for reflection (and deeper learning) was outlined. Students are given a handout with the four scenarios. They are put in groups, read, and then discuss. Strands between the accounts are identified, forming group frameworks. (p59)

At the heart of the graduated scenario technique, is the requirement for the student to make judgements about and evaluate increasingly complex material. They must not just read, but also agree best practice regarding progression from descriptive to reflective. This technique can be used for process evaluation including architecture and art. (p61)

Moon states the graduated scenario is a problem solving task with a creative element, to summarize outcomes. She observed that participants enjoyed it, and became engaged. She states it is possible to do in large classes and tiered lecture theatres (2009, p63). This is a benefit for our large cohort.

This appeared to be a good group bonding ‘warm up’, activity for the first meeting of new architecture students (September 2014). Three reports were selected from the existing pool from September 2013, ranging from descriptive to reflective. I made notes based on the reports and ranked them for reference. Figure 2 indicates a more reflective report, with much testing, analysis, and explanation. Figure 3 is a more descriptive account, relying mainly on unexplained images.

Students groups were asked to rank the projects and note reasons. We discussed and compared results. One group ranked a certain project lower than I. I then shared my findings of a recent site visit– where I discovered pieces of this project unused and scattered across the site. We agreed that a year on, the project demonstrated little reflection regarding fitness for purpose, dropping its ranking.

It is hoped this activity exposes students to the excitement of achieving their own projects. It appeared to help with bonding. Another hope is that it will help them judge what to produce and to increase reflection, aiding in their analysis of the builds. Results have yet to be seen, but initial indications are positive. Future tutor analysis, could lead to new and improved learning outcomes, moving towards reflective, deep learning.

### 3. MOTIVATION AND LEARNING

According to Biggs and Tang,

The key to motivation is to ensure academic activities are meaningful and worthwhile ...[for example] problem-based learning where real-life problems becomes the context in which students learn academic content and professional skills... Problem-based learning is usually undertaken enthusiastically ... (2011, p37)

This was our experience. Live projects whilst a small part of the course, were generally popular, and had positive feedback. It could be said that architecture students, with the goal of becoming architects, have an intrinsic interest in designing a building then seeing it built. Live projects, providing real clients, real designs, and real builds, can be seen as having a large motivational value. ‘The best sort of motivation arises from intrinsic interest, fascination...’ (Biggs & Tang, p34)

According to Biggs and Tang (p35), there are two factors that make students ‘... want to learn something:’

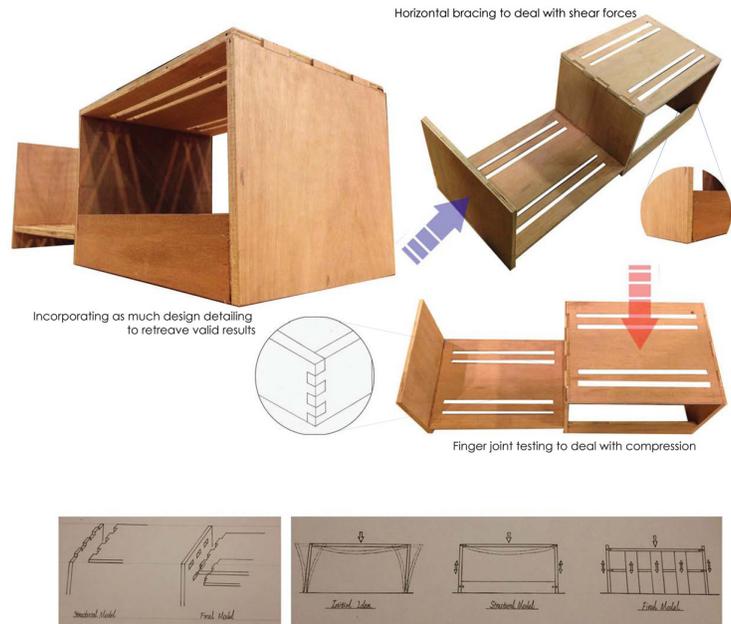
1. It has to be important; it must have some value to the learner.
2. The learner needs to expect success when engaging the learning task’

The challenge for live projects, is to ensure that the latter, expecting success, is facilitated. This can be done via assistance of tutors and engineers, providing facilities to assist completion (eg. access to workshop), and also by showing successful completion of projects from previous years.

Value can be attributed to intrinsic interest in designing and building. However, this may need to be highlighted by tutors. Also, the invitation of previous year’s students for inspiration (and questioning and advice) may be possible.

There are different categories of value Extrinsic, Social, Achievement, and Intrinsic, described by Biggs and Tang (p35 - 37, 55).

Extrinsic: is what it produces. This has consequences, such as reward and punishment. Generally, quality is low, because of the focus on consequence, not task. Negative reinforcement is worse than positive. This has been our observation from feedback regarding a mini competition held, something to watch out for in the future:



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While I liked the idea of the prize, our team were really disappointed that we weren't even shortlisted as we had worked so well as a team and were all really passionate about the project. While I think that it is beneficial and a motivator it did leave us feeling a bit rejected. (student)

Social: what other people think/value. Teachers who show love of a subject can be inspirational. Experience and enthusiasm of tutors can impact on groups. Additionally, approval from and sympathy with a client could be motivating. The following client post occupancy feedback indicates social motivation, in students meeting client needs.

The design and end product were both great the team had meetings with myself and the exec chef so that they had a very clear idea of what it was we wanted and delivered to that brief with a few added bonuses...

Achievement: ego enhancement, for example competition. It can lead to deep learning as once students start to compete and focus, they may become more interested and enjoy the task. But, there is a danger that with poorly aligned assessment, a strategic student might obtain high grades with a low level of learning (surface learning). Also, it can damage learning of students who find competition threatening. So, competition can help students achieve, and motivate, but there are drawbacks. Whilst the competition helped to emphasize that appearance of the projects was important, it actually led some students away from reflective practice and deep learning. According to post occupancy feedback from Cox:

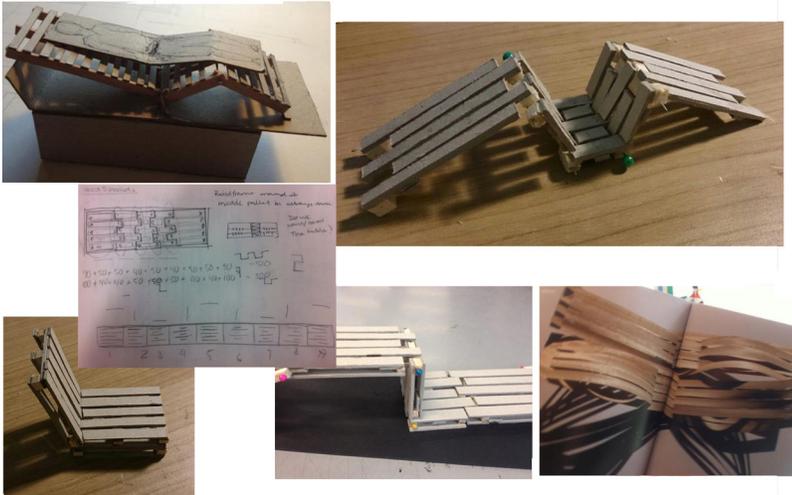
The competition focused the goal on an end product rather than learning/reflecting through making. ...having one winner seemed to go against any intrinsic motivation the students had to take part, reflect and learn.

In fact one of his teams, whilst achieving a good mark for construction, appeared not to have had a deep learning experience, or take the opportunity to reflect, pushing on instead with completing a final product: '...they didn't ...[take] enough time to talk to the client as a group or experiment with ideas, materials...' (Cox feedback)

Intrinsic: the process of doing it - the academic ideal. Students learn because they are interested in the activity itself. (Biggs & Tang, p36). With our projects, there was some success in this area; students motivated intrinsically and enjoying the tasks:

Figure 2: Student live project testing, 'Flatpack Planter', Autumn 2013. For graduated scenario: higher reflectivity. Observations of completed object: experimental, well tested, changes made based on observation and reflection, fully met client requirements whilst developing its unique form.

## Developing Ideas: combining ideas of final model



The first Live Project at the start of the semester was really fun and really useful, I felt that I gained a lot from the project. (student) <sup>3</sup>

The students did a fantastic job designing and building... Most importantly, they seem to have relished the opportunity and set about the work with humour and industry. (client)

The latter comment was regarding a team who produced a great project and also achieved good marks.

### 4. AUTHENTIC LEARNING

Much of the success and interest reported on the projects is due to their real nature. According to one student:

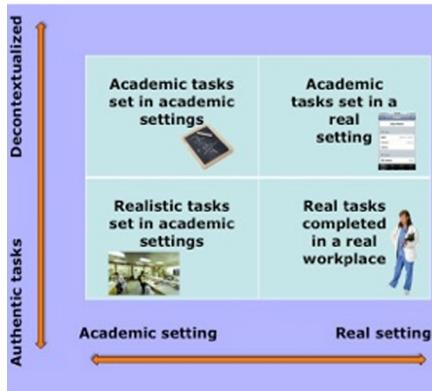
I really enjoyed the Live Build Project ... I actually felt that I was learning through hands-on building experience about construction, structure and having to cope with the constraints of a real life project.

There were two strands of authenticity, the first was the real project (with a client, brief, budget, and site) and second was the prize and competition.

The competition was introduced during the running of the projects. It was felt students were not necessarily making links between design quality (and decisions) and making something to be built - that design was somehow different than making. A prize, based on a popular and real competition, the Stirling Prize, was introduced. On the surface this seemed to work, and most of the projects were awarded high grades. However, as discussed previously, there are drawbacks: with only one winner, students may become demoralized.

If managed correctly, there are motivational benefits of realistic scenarios, also called authentic learning. Authentic Learning is a realistic task in an academic setting (Herrington & Oliver, 2000). It is complex but cognitively real. It can be done in class but set up as if it was in the real world. See the matrix, figure 4. Authentic learning in a classroom is referred to in the bottom left corner. Our projects lean more towards the centre towards real tasks in a real workplace (this latter being more like an apprenticeship and driven by employers). Live projects would thus straddle the line between class and real workplace, and be just on the 'academic'

Figure 3: Student live project testing, 'Seating/ Meeting Area', Autumn 2013. Graduated scenario: lower reflectivity. Observations of completed object: little experimentation and testing demonstrated, interesting looking but form is unexplained, does not appear to meet the client brief - to allow seating and meeting.



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**NINE ELEMENTS OF AUTHENTIC LEARNING:**

1. Provide authentic contexts that reflect the way the knowledge will be used in real life.
2. Provide authentic tasks and activities.
3. Provide access to expert performances and the modelling of processes.
4. Provide multiple roles and perspectives.
5. Support collaborative construction of knowledge.
6. Promote reflection to enable abstractions to be formed.
7. Promote articulation to enable tacit knowledge to be made explicit.
8. Provide coaching and scaffolding by the teacher at critical times
9. Provide for authentic assessment of learning within the tasks.

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Figure 4: Authentic Learning Matrix (from Herrington, *Authentic*).

Figure 5: Authentic Learning (Herrington & Oliver, 2000).

side. They are real tasks set within academia, but not fully in a classroom setting, having a real site and client.

The challenge is to identify critical aspects of ‘situated learning’ and find methods that can be applied to a classroom, meeting more focussed academic requirements (Herrington & Oliver). This will become authentic learning. Situated learning is that which occurs typically in a workplace scenario, in a context that ‘...emphasises that the learner (or worker), engages with others to develop/ create collective understanding as part of a community of practice.’ (Fry et al., 2009, p21). So authentic learning transfers benefits of situated learning, into the classroom.

The framework for authentic learning, is defined as having 9 elements, see figure 5. This provides a useful guideline to review the architecture projects. It becomes clear that live projects can easily be considered authentic learning. Some key points are relevant:

Regarding points 1 and 2, there is no doubt that the live projects are authentic contexts and tasks, being real projects.

Regarding point 3, it is suggested that performance is used to create a realistic scenario, and a sort of play acting by teachers/professionals, possibly with digital media. Live projects are step further towards authenticity: consultations are with real engineers/clients. Tutors, also, are construction professionals involved with building.

Regarding point 4 and 5, students must consider different perspectives that members of real design teams must consider, eg. client requirements, design integrity, costs, programme. They must take roles, as a mini design team, and be responsible for different aspects of a construction. Working together as a team, they must consider different viewpoints, and complete the project on site.

Points 6 to 9 are the elements that are perhaps the more cognitive, that stray from a traditional apprenticeship. In Design-Builds, reflection and articulation are encouraged in the final report to the assembled class. As discussed above, moves can be made to deepen reflection. Coaching and scaffolding have been provided in the form of workshops and regular tutors meetings.

Specifically regarding point 9, the assessment took place at the presentation stage. It was based on a modified assessment matrix selected from the general learning outcomes of the course. The markers were academics, but also experienced building professionals (so there is an element of authenticity).

Additionally, an informal assessment of the design was in the form of a competition (a dinner awarded to the winners). The competition could be considered authentic assessment, as the judges were clients and professionals. However, marking was separated from this, and as discussed previously there are cons.

This year an update to assessment requirements has incorporated some of the ‘prize’ requirements, into learning outcomes. Additionally, learning outcomes have been developed to encourage reflection.

**CONCLUSIONS**

Both clients and students have given positive feedback for the Design-Builds, their reality being a strong feature:

I really really really want there to be more Live Projects ... I’m glad that I had the chance to explore one in this module. We are being trained to Design-Buildings - why aren’t we learning how to build them? (student)

Over the last year I have commissioned [much]... design and build work ...

and only wish that some of the company's I have worked with gave as [much] thought to [these] projects as your teams obviously have. (client)

They have been considered successful thus far by students and clients. It is anticipated they will be further developed in the curriculum in coming years.

Review of the projects, feedback, and current educational literature, has highlighted strengths to be maintained, and also areas to be improved, in order to ensure that students gain the highest educational value. Moves have already been made, in this second run of the projects, to this effect.

Design-Builds are found to be an ideal medium for reflective learning. They can be part of an ever deeper cycle of reflection and learning, through designing, testing, reporting, and critiquing. Borrowing of social sculpture and phenomenology techniques can contribute to deep learning and reflection of architecture students. Possibilities include more focused post occupancy review and reflection, leading also to better results for future clients. Further, year after year, the graduated scenario technique could be used by students and staff to improve understanding of how to achieve highly reflective and critical projects.

Positively, students appeared to be motivated to learn. Care needs to be taken to support the deep learning possible, and facilitate the intrinsic value of the projects. Thus, it is a priority to maintain interest and enjoyment, in building and associated activities.

Clearly, Design-Build fits into the category of authentic learning. Attention should be given to develop cognitive aspects of projects - to keep them in the realm of academic learning and development. This is complimentary to and moving beyond the physical achievements of making interesting objects for clients. This is facilitating interest and creating an ethos of inquiry and critical reflection, something that students can carry on within themselves, as well as in their portfolios.

It will be interesting to see what this year brings, and the continuation on to next year. The cycle continues on, with potential for all involved to build and reflect – academic staff, clients, students... What will this year's objects tell us next year?

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