

The Formation of the Concept of “Collaborative Learning Space”

Andy Blunden, *Independent Social Research Network*, and Michael Arnold, *History and Philosophy of Science, the University of Melbourne*

The birth of a new concept is a rare event and a person should consider themselves lucky to witness the formation of a new concept in the wild. The concept whose formation is described below is “collaborative learning space,” a type of classroom different from a lecture theatre or a seminar room or a computer lab.

We describe how the concept of Collaborative Learning Space emerged in 1999 at the University of Melbourne, Australia.* The creation of this concept was not the outcome of any decision by the University’s management or any formal consultation. The concept arose by means of a process more akin to a social movement. It represented the solution of a problem which had emerged due to the contradiction between teachers’ need for university classrooms suitable for Collaborative Learning and other student-centred modes of teaching and learning, on the one hand, and on the other hand, the existing infrastructure which remained an objectification of the once-dominant didactic, information-delivery mode of teaching. We follow how the new concept was first articulated, then realised in the form of classrooms designed for Collaborative Learning, and further objectified through the incorporation of the words in University documents and procedures and changed teaching activity. We follow how some elements of the original concept have thoroughly embedded themselves in social practice and spread throughout the country, others have been subject to generalisation while other aspects were misconceived, and consider the factors which have influenced the trajectory of the concept as well as its initial emergence.

We also briefly investigate the conditions which led to the emergence of the concept at this time, not only in Melbourne, but independently in other parts of the world.

The authors collaborated in a project at the University of Melbourne in 1999, and this report is based on electronic records from the time and interviews with those involved conducted in 2011. The authors come from two very different strands of research. AB uses an Activity Theory approach drawn from Hegel, Marx and Vygotsky, and critically informed by the work of other writers in Activity Theory, such as A. N. Leontyev and Y. Engeström. MA locates himself in the field of socio-technical theory, drawing on the philosophy of Martin Heidegger. The two authors found agreement on all the issues of substance in the project in which they collaborated and in the subsequent analysis of that process, despite being situated in different theoretical frames. AB’s theory of concepts is outlined in full in his book: “Concepts. A Critical Approach,” published by Brill in April 2012.

A new concept arises within some social practice in the form of a problem, and a solution (Vygotsky 1987, p. 123-4; 1994, p. 257-8). In other social situations the identification of a “solution” gives rise to the identification of a “problem.” The problem-solution relation is thus bi-directional, at least in principle.

The social situation we have in mind here is the university, specifically in the 1990s in Australia. Universities are institutions which, as a key part of their activity, provide rooms

* According to Robert J. Beichner and Joseph Cevetello (<http://net.educause.edu/ir/library/pdf/ELI7092.pdf>), January 2013, the concept of Collaborative Learning Space originated at the North Carolina State University in the mid-1990s. The developments described here occurred independently.

THE FORMATION OF THE CONCEPT OF “COLLABORATIVE LEARNING SPACE”

to teachers and students for the purpose of teaching and learning. However, those in the university responsible for designing, building and allocating teaching spaces, on the whole had an understanding of teaching and learning which reflected a centuries-old, unchanging understanding of how university education is done, objectified in the University's buildings and the configuration of their teaching spaces (Leontyev 1978, p. 66). The teachers on the other hand had diverse views on how to teach, which responded not only to tradition but also to continuously changing views on learning, and had various opinions on what might constitute a suitable space for teaching. Most teachers found the existing infrastructure for teaching unsatisfactory in various respects and to various degrees, but had no means of addressing the problem, as teaching space was largely provided by the central bureaucracy, and there was no position within the bureaucracy responsible for planning and supply of teaching spaces. At the time, there was almost no research literature on the problem of design of physical spaces for teaching and learning. In 2002, a monograph was published in the US (Chism & Bickford 2002) raising the same concerns, including a literature summary which confirms that research on university classroom design was embryonic even in 2002.

One of the authors (AB) was at the time the supervisor of the Audio-Visual Unit, whose technical staff assisted teachers using the equipment in the lecture theatres. AB thus became aware of the considerable dissatisfaction amongst teachers, who frequently vented their frustration on the technical staff who came to their aid when equipment failed to work for them.

In March 1999, AB began visiting teaching staff and:

“collecting descriptions of how people would like to educate if they had teaching space infrastructure of their own desire, and aiming to develop plans to build and equip some central teaching spaces to provide for that. I'm looking at the 20-70 seat capacity range” (email to JG, 25 March 1999).

On 30 March, AB reported to management on the results of these consultations:

“I get the impression that there is widespread need for spaces to accommodate ‘collaborative learning’, always keeping mind that this activity would supplement large lectures, individual computer-lab work, private study and library access. There would be a lead time between provision of spaces for this type of work, and adjustment of curricula to orient towards the opportunity” (<http://wayback.archive-it.org/2927/20120105030512/http://trs.unimelb.edu.au/archive/seminar1.html>)

On 15 April 1999, AB informed his collaborators:

“Having spoken to a number of members of University teaching staff about requirements for *collaborative learning spaces*, we have identified the need for a means of freely moving the video from one computer to another or displaying it for all to see.” (email from AB, emphasis added)

On 11 May 1999, in response to submissions drafted by AB, the Dep. V.-C. (Resources) announced an allocation of funds “for the development of Collaborative Learning and Teaching Spaces as part of the 2000 Lecture Theatre Upgrade Program” including \$165,000 for the Cecil Scutt Room, attaching an equipment list.

We see here how the term “collaborative learning space” was invented by teaching staff who were frustrated by the implicit assumption, evident in the configuration of teaching spaces, that all teaching and learning at the University is didactic (teacher-centred) delivery of information. AB provided a vehicle to mediate between the need and a means of its resolution, so that the word “collaborative learning space” first became objectified in AB’s communications, and eventually in an allocation of funds by the University for the construction of “Collaborative Learning and Teaching Spaces.” Initially, no-one knew what such a space would look like, only that it would meet a certain deficit in the university’s infrastructure, by supporting specific modes of activity, that is, concepts of teaching and learning; and none of those responsible for the provision of teaching infrastructure had even heard of the concept of “collaborative learning.” The problem now was to concretise the concept and institutionalise a solution within the university’s material fabric, self-consciousness and practices.

In April 1999, AB had identified a candidate room in the Arts Building, the Cecil Scutt Room, and acquired from the Timetable Office a list of room allocations and identified History and Philosophy of Science as the Department in the Arts Faculty with the largest share of small-group teaching. He asked the Head of that department who was the most innovative and active member of the teaching staff and was directed to the co-author of this paper, MA. MA was perhaps nominated by the Head as an innovative teacher because the Head shared a widespread misconception that equates innovation with new technology, and MA’s research background and teaching practices focused on new technologies. Innovative or not, MA accepted the brief, but not without initial reluctance. As the Head explained it, the task was to represent a teacher’s perspective in the design of a new teaching space. MA anticipated endless hours of consulting with other teaching staff, reconciling contrasting demands and desires, arguing the merits of different pedagogies, bickering over aesthetics, prioritising desired features, finally negotiating an uneasy set of compromises, then doing it all over again with AB, who would no doubt need to squeeze all of the above into a set of budgetary constraints, health and safety considerations, heritage overlays and the like.

However, MA’s first meeting with AB set out a scenario that put these fears to rest. In what MA took to be a very radical move, AB explained that the University would build a Collaborative Learning Space designed to his meet MA’s needs alone, and even more surprisingly, that money was no object. The thinking was that a “broad” design strategy built around wide consultation and compromise among users is not the only way to develop and deploy innovative ideas, and that a “narrow” strategy eschewing consultation and compromise was a viable alternative. This move took the design of the space out of the architectural-engineering-industrial design paradigm, which emphasises satisficing the imagined or empirically determined desires of a defined group of client users, to an “art” paradigm, which emphasises an authentic expression of the vision of the creator, without regard for the opinions of a potential market. AB believed that meeting the needs of just one of the 3,000 teaching staff perfectly, would be bound to meet the needs of a sufficient number of others to fully utilise the room. If successful, the remaining 470 rooms could be subject to a similar process, building excellence through divergence rather than convergence – that is by supporting a range of exemplar concepts of teaching, rather than a single prototype or ideal of teaching. This approach enabled effective collaboration between one teacher and one architect with a clear concept of what was needed, rather than a compromise between numerous stakeholders with the concomitant danger of meeting no-one’s needs. Negotiations amongst a large group of the teaching staff who would use the room was in this scheme, neither necessary nor desirable. Of course, all concepts are

formed collaboratively insofar as the concepts are socially, historically and culturally interpolated, but collaboration is not always an overtly deliberative process.

The absence of a budgetary ceiling meant that the space might be imagined without being in any way constrained by considerations of cost. The problem of fitting into a budget would be confronted at a later stage once the ideal solution had been clearly conceived.

At this first meeting AB and MA quickly agreed that collaboration was a key concept that would inform the design of this small teaching space. This was to be a non-controversial anchor for our thinking. The Cecil Scutt room was a small teaching space used for many decades to accommodate tutorials and seminars. Tutorials and seminars are by tradition collaborative, involving relatively small numbers of students (say 12-25) in conversation, questioning, debate, small-group work, and other forms of interactive and communal activities. Despite the ubiquity of these practices, rooms at the time were most commonly configured for didactic, teacher-centred instruction only, with desks and chairs in straight rows facing the teacher at the front. The question for MA was not therefore, how to overthrow a style of collaborative pedagogy which teachers were using despite the fit-out, but rather how to better configure a room to better facilitate a longstanding pedagogical strategy, as well as providing for more developed strategies.

From there, numerous discussions took place between AB and MA, during which MA set out the conceptual bones of the concept, and AB suggested ways that flesh might be put on those bones, through input from architects, furniture designers, and equipment suppliers. This marked the first phase of ‘advancing from the abstract to the concrete’ (Marx 1986/1857, p. 38) – building the first space designed for collaborative learning. The process of conceptualising the space was not laborious, and quickly settled around a number of needs.

The first and most obvious is that the space should remain convivial for group discussion involving all the room’s occupants. The dimensions and volume of the room set a good foundation for this, providing good lines of sight and good acoustics, and while the furniture was inflexible, tatty and run-down, the space itself was a good venue for discussion, and the room was consequently a popular one. Whatever we might do to alter the room, it should not reduce its capacity to enable 20 people to engage with one another as a group.

A second tradition that needed to be maintained was that the room remain convivial for didactic teaching and learning. Tutorials and seminars frequently require that one person take the floor, lead the discussion, field the questions, set the agenda, and so on. The existing configuration met this need when the person taking the lead was the tutor, but met the need less well when the person taking the lead was a student. Any tension between support for collaborative methods and didactic methods had to be resolved.

A third need to be met was that the space facilitate collaboration among small groups of students – say 4 or 5 groups of 4 or 5 students. Enabling students to participate in discussion in small groups was seen to be important in ensuring that all students were active participants in the proceedings, and actively engaged with the questions and issues at hand. Facilitating convivial small-group collaboration requires that participants are positioned in the space in a certain way, and the fore-mentioned whole-of-group collaboration requires a different configuration. The space therefore needed to enable the occupants to make a painless shift from a whole-of-group configuration to a small-group configuration and vice versa.

None of the above ambitions for a collaborative space was particularly novel, and all have been tackled in one way or another many times before, using traditional furnishings and

equipment. However, MA was of the view that digital equipment had the potential to extend collaborative practices to new domains.

The first was to furnish the room with equipment that would enable tutorial groups to interact with tutorial groups in other countries, or in other Australian universities. In year 2000 Internet-based asynchronous document exchanges and emailing were well established practices, and synchronous text messaging, voice over internet protocols and video conferencing were emerging, and seemed to be moving from the exotic to the routine. The capacity to mediate collaboration beyond the tutorial, and in particular to engage students from other countries in real-time interaction, was seen to be a significant move.

The second more novel manifestation of collaboration was to furnish the room with equipment to enable collaborative activity to be anchored to texts. The centrality of text to pedagogy is a practice that extends back to the medieval university, but through the application of digital texts in the place of paper texts, it was thought that text might play a still more important role. It was thought that this could be the case if students and tutors were able to access published digital texts via the Internet, on an as-needs basis. The group would still have access to set readings during the tutorial, but would also have access to what was at the time a rapidly increasing international repository of digitised scholarly publications. In addition to vastly increasing the pool of scholarly texts available to the tutorial, students would also have access to a vast repository of popular media, available through countless numbers of websites. In addition to these scholarly and popular publications, it was thought that students might also have access to their own writing, and might be able to share it around the whole group (or beyond), and work collaboratively in small groups to edit or author their texts. Digital texts of various kinds were therefore cast in a central role in providing a material and performative basis for collaboration in the room. (Other media, such as video and music, were not cast in an important role, were not specifically catered for, and needed to be retro-fitted at the request of other teachers.)

A third desire for the room, was that it somehow enable the tutorial activities to escape the time and place set aside for the tutorial on the timetable. That is, the activities of the tutorial – the issues raised, the key elements of discussion, the texts referred to, edited or authored – should be available to the tutorial members outside of the confines of the tutorial itself. In a real sense, tutorials are precious resources. A typical Australian university will only offer 12 weekly tutorials in any given subject – scarcely time enough to engage with the ideas and to engage with others around those ideas. It was thought that considerable benefits might accrue if ways could be found to move beyond the confines of the weekly meeting.

A lot was therefore demanded of the furnishings and equipment to be fitted in the room, and over a period of weeks and months, through collaboration between AB and MA, and between AB and architects, furniture suppliers, and digital equipment suppliers, the following design features emerged.

The first mentioned need for how the room might perform was to be met by furnishing the room with 5 oval shaped tables, each capable seating 4 or 5 students, in order to facilitate small-group collaboration. The tables were in turn arranged in a semi-circle, and chairs were on castors, to facilitate whole-group discussion. This configuration of table shape, table placement, and swivel chairs, enabled a seamless move from small-group work to whole-of-group work without having to rearrange furniture.

The need to also facilitate didactic teaching and learning methods was met by placing one table front and centre, and handy to white-boards and an Interactive WhiteBoard (IWB).

THE FORMATION OF THE CONCEPT OF “COLLABORATIVE LEARNING SPACE”

This table was to be used by the tutor, and was symbolically privileged by its particular location in the room.

The need to place digital text at the centre of tutorial activities was met by equipping each of the tables with an Internet connected computer, through which scholarly texts and other web-based media might be accessed, all the computers being linked by local networking software. The shape of the tables, and the position of the screen on the table, provided each of the students around the table with a line of sight to the shared screen. One student at each table needed to operate the keyboard and mouse, and the students at each table therefore needed to agree on the use of the keyboard and mouse – what words were to be typed, what documents accessed, and so on.

The position of the screen on each table posed the difficulty of reconciling a need for clear lines of sight from each table to the screen, while not blocking clear lines of sight from one table to another. The “money is no object” design solution was to equip each table with a hinged flat screen, to be raised for small group work at the table, and to be lowered to give students clear lines of sight from one table to another. But while the design was not constrained by money, the build was, and CRT screens (far cheaper than flat screens in year 2000) were installed instead, compromising lines of sight across the room.

Each table of students was able to search, browse and access their chosen digital texts via the Internet, discuss the texts among themselves, edit the text if in read-write format, or annotate the text if in read-only format. Collaboration between tables of students and among all tables of students was facilitated by the networking software that enabled the display of each screen to switch its source of input. So for example, table 4 might switch its view to mirror the view of table 2. Those two tables of students, or all five tables, might then discuss the same document, using conversation at the table and across the room, and using on-screen text editing and annotation. Software on the tutor’s computer could also be used to direct the source of each screen’s input, so for example, all tables might mirror the tutor’s computer, then pass to table 3, then 2, and so on. The room was also equipped with a projector, and input could be taken from any computer in the room to be projected to a large format display screen at the front of the room.

This large-format display screen was an IWB – at that time becoming popular in board rooms and commercial conference rooms, but this IWB was the first to be used in an educational setting in Australia. The IWB enabled the tutor or a student to display content supplied from any of the room’s computers, and to annotate that display using a keyboard, or by hand, using four coloured ‘pens’. The displayed text, now annotated by the tutor and the students, might then be captured and saved, and emailed to a subject website, to all students in the subject, or to any subgroup of students. In this way the work of the tutorial is not only recorded, but might then continue at other times and in other places.

In early 1999, at the same time as AB was lobbying for funds for Collaborative Learning Spaces, the library had received a bequest from the Percy Baxter Trust of \$600,000 for library development. Interviews conducted in 2011 brought out the fact that the then-newly appointed VP (Information) had just returned from the US with the idea of an “Information Commons” and a project was underway to use the funds to create an Information Commons in the library. However, as a result of conversations with the Dep. V.-C. (Resources) in April 1999, she decided that rather than being seen to copy an idea from the US, the funds should be used to create the “Percy Baxter Collaborative Learning Centre.” KK, who led the project team, reported that “this name caused the working group to reflect on what the role of the Percy Baxter space would be? What would be meaningful to students? How will students use the space? The idea of a ‘Collaborative Learning Space’ crystallised these reflections, and from that time on the aim of the working group was to

create a space for collaborative learning” (Interview with KK 18 March 2011). The Medical Faculty, where AD was engaged in creating a suite of Problem Based Learning (PBL) rooms to support a total restructure of their curriculum, also lobbied for the idea of “Collaborative Learning Space” to be implemented in the library.

The Centre opened in June 2000, but due to shortage of funds, no tables suitable for student collaboration could be purchased until later. However, 60 computers were installed, all placed either in individual study carrels which made it difficult for more than one person at a time to use the computer, or at large tables in two training rooms, with students obscured behind a VDU screen while addressed by a trainer at an elevated podium. The suite of software installed did not include any software designed for collaboration. Nonetheless, despite these mishaps in the design of the Centre, which demonstrated a failure by the designers to grasp the notion of collaborative learning, the concept of building for collaborative learning was only just emergent at the time. Students made use of the space and its extended opening hours for collaborative study and the limitations of the fit-out were gradually overcome (Interview with DE 11 March 2011). Since then, the Library has created an ever-increasing number of spaces in branch libraries, providing an attractive environment for lap-top use and student collaboration, all equipped with wireless LAN and marked by café-style furniture with machines for students to buy drinks and sweets nearby. Library staff still (in 2011) refer to these spaces as “Collaborative Learning Spaces.” Students use the spaces to study together in groups, using a shared computers and electronic resources. They are unsupervised and at this point (in 2011) do not involve the use of IWBs.

Over the three years before AB retired in 2002, a further 24 CLSs were built using University central funds and others using departmental funds. The single common feature of the various designs was round, oval or boat-shaped tables to facilitate student collaboration. It transpired that the oval table was the “germ-cell” (Marx 1996/1867, p. 8) – the simplest, empirically given thing which encapsulated the concept of building for collaborative learning – but this was not clear at the time of the first phase of ascent from abstract to concrete with the design of the Cecil Scutt Room. This only began to emerge in the second phase of ‘ascent from the abstract to the concrete’ with the process of proliferation, in the second year of the program.

In the first year of operation however, the Cecil Scutt Room was grossly under-utilised, because no measures had been taken to see that the Timetable Office allocated to the room to teachers who wanted to do collaborative learning. In 2000, this was corrected by adding a new fourth type, “CLS” to the set of “Room_Types” used by the *SyllabusPlus* room allocation software (Theatre, Seminar/Tutorial Room or Laboratory). Teachers could then specifically request that they wanted a space for collaborative learning.

Demand for Collaborative Learning Spaces soon overtook supply, and according to the pro-VC (Teaching & Learning) still outstrips supply a decade later (Interview 8 April 2011). In May 2001, a Teaching Infrastructure Committee was created to mediate between the needs of teaching and the staff responsible for creating and maintaining the infrastructure, overseeing the capital program for the construction of Collaborative Learning Spaces and Lecture Theatres. Faculties such as Medicine and Engineering were already committed to collaborative learning and CLSs could not be built fast enough to meet their needs.

The University administration had been committed at the time to decentralisation of responsibility for maintenance and construction of teaching spaces, but the creation of CLSs was predicated on a reversal of this decentralisation policy. Despite this, the CLSs were almost all built with central funding and allocated centrally by the TimeTable Office.

The necessity of central production, maintenance and distribution of teaching spaces imposed itself on the university leadership despite themselves and remains university policy to this day.

Further, “laboratory” was a concept at the university which not only entailed a room being characterised by its equipment, but implied that the room was “owned” by a Department for whose discipline the equipment was designed. Throughout the process of establishing the concept of “Collaborative Learning Space” a constant struggle had to be fought against the conception of teaching spaces as containers of equipment. Because most of the CLSs had installed computers, staff called them “Computer Labs.” This not only misrepresented the function and conception of the rooms, but implied that the local departments had control over their use and were responsible for their maintenance. For example, in 2001, when two Collaborative Learning Spaces were commissioned near to the Psychology Departmental office, the Department tried to put signs on the door naming them “Computer Labs.” Installing and maintaining multiple computers in CLSs had considerable cost implications and as Centrally Allocated Teaching Spaces, this cost accrued to the centre, and central staff had to be employed for the work. This struggle over the implications of “Collaborative Learning Space” as opposed to “Computer Laboratory” took about a year to resolve, but once the central administration agreed to continue picking up the cost of computers (not formerly included in building project costs), the battle was won.

Different implementations of the idea were developed with teaching staff in different disciplines. The size of tables and the number of students per group varied from one discipline to another. Education, for example, favoured groups of 7 per table and made generation allowances for space; the science disciplines favoured even numbers while the humanities favoured odd numbers. Philosophy preferred around 10 to a group. Some disciplines required audio-visual equipment of various kinds to be available, some used IWBs and some didn't. But the oval tables were a constant feature. Lately, the tables have been built at bench height so that students can stand and move around with even greater ease.

All this architectural work was driven by the efforts of teaching staff. Some years would pass before the Vice-Chancellor's office learnt what “collaborative learning” meant.

The Current Position

Of 39 Australian universities, 27 have Collaborative Learning Spaces, 5 more have Collaborative Suites or Studios or Rooms, and only 7 have not explicitly applied the term.

At Melbourne, in 2011, 65 of the 192 classrooms are CLSs, but this term is now a generic name for four types of room, categorised according to whether there is student-only access and according to the level of equipment installed. Some have computers for shared student use, some have IWBs, most have Wireless LAN for laptops, but some also have only furniture to facilitate student collaboration, and no intrusive equipment. Nonetheless, “Collaborative Learning Space” still designates a family of room types whose only common equipment feature is oval tables, and this term is used by maintenance staff, senior management, library staff and teaching staff. For a number of years the objectification of the concept in the words “Collaborative Learning Space” on signage outside of rooms, their listing as “Collaborative Learning Spaces” on web pages, and their classification within the *SyllabusPlus* database, constituted an effective objectification of the words “Collaborative Learning Space.” With changes of personnel in various administrative positions, these forms of objectification have disappeared in the last few years. Nonetheless, the material form of the rooms themselves has proved to be extremely

persistent – just as the rank-and-file room design which had dominated university classrooms since time immemorial had firmly objectified a didactic, information-delivery mode of teaching. “Collaborative Learning Space” is now part of the language and the life of the university.

Currently, the TimeTable Office no longer have “CLS” as a Room_Type in the *SyllabusPlus* database; a mere 5 are of type “Electronic Learning Studio” alongside 293 “Lecture Theatres” and 187 “Classrooms.” It appears that the operators who do the classroom allocations, use their knowledge and that of their clients to allocate one of the 65 CLSs to those requiring it. The *SyllabusPlus* database uses only a small number of Room_Types which represent true concepts. In general, the database supports a concept of teaching space according to a list of “suitabilities,” invariably interpreted as the installed equipment. This conception of a concept as a list of contingent attributes is almost ubiquitous within bureaucratic and information system processes, as this impoverished conception of concept facilitates large-scale automated procedures.

There is one *misconception* which has arisen from the 1999 initiative which is instructive. A key feature of the original design was the IWB, which allowed direct manipulation of and shared eye contact with a text by the whole class. The software initially used to facilitate data sharing has now been superseded by hardware switching which allows the tutor to better manage the collaboration, but collaboration remains the *raison d’être* of the IWBs in the CLSs. However, in the decade since this first application of an IWB in an educational setting, the IWB has spread to both universities and schools throughout Australia and New Zealand, to the extent the four companies supplying them sell 80-90 new boards into the educational market every week and approximately 150,000 teachers have been trained in their use, according to the suppliers. But the IWBs are used as presentation devices, and nowhere used for collaboration. It is widely perceived (Sweeney 2010), that despite the real value of the technology as a teaching aid, they are usually installed for prestige purposes (see also Arnold 1996), and it takes at least two years for teachers to overcome the difficulty in using them, before they add value to teaching and learning. During those first two years, learning is markedly *less* collaborative. It seems that an idea which is objectified in an iconic piece of branded equipment, marketed by its suppliers, takes hold and spreads far more easily than the form of activity which the equipment may support. Technology changes quickly, cultural practices change slowly.

It could be said that just as the oval tables were the germ-cell of the concept of Collaborative Learning Space, the IWB was the germ-cell of a *misconception*, namely the concept of a teaching space provided with advanced electronic equipment, represented by such terms as “Digital Classroom.” Perhaps if Collaborative Learning Spaces were purchasable *prêt-à-porter*, then the concept may have been institutionalised even more firmly.

This also raises the question of the role and power of prestige in the institutionalisation of a concept. Not all universities in Australia have adopted the term “Collaborative Learning Space.” Every University that has gone through the same process of inventing new designs of classroom to meet their pedagogical needs, or to meet their need to position themselves favourably in the education market, has branded their infrastructure with a new name: “Advanced Concept Teaching Space,” “eLearning Studio,” “Flexible Teaching Space,” “Digital Classroom” and so on. Every institution highlights its innovation with its own brand name. The same factor has been involved in the purchase of expensive electronic equipment for prestige purposes. The competitive drive for status recognition militates against the entry of a word into general currency. The concept of designing university

classrooms to support collaborative learning is now mainstream, though the spaces are not called “collaborative learning spaces” in every institution.

As the history of science has demonstrated over centuries, a new idea is the product of its times, and when a new concept emerges, it invariably does so in more than one place at the same time. As Goethe put it: “the greatest discoveries are made not so much by individuals as by the age” (Goethe 2006/1823). At the University of Dayton, Ohio, in 2002, teaching staff confronted exactly the situation described above, their response was almost identical, and has been recorded in a book: “The Importance of Physical Space in Creating Supportive Learning Environments” (Chism & Bickford 2002) still available on their website: <http://spacesforlearning.udayton.edu>. As of 2011, demand for CLSs at the University of Dayton has increased. The book outlines principles for the design of Collaborative Learning Spaces and the procedures and structures to support the spaces, that are remarkably similar to the concepts adopted at Melbourne. These issues led to the founding of Educause in 1998, a not-for-profit organisation which has played the leading role in generating the burgeoning research literature which has grown up on this subject (Oblinger 2006). This literature rests, in one way or another, on the principle that physical spaces for teaching and learning should be designed to support contemporary modes of learning. Likewise, at just the time AB was intervening in the design of teaching spaces at Melbourne, the technical managers who were his opposite numbers in British universities set up an email group to discuss the problems of technology in teaching spaces, leading to parallel processes of innovation.

DISCUSSION

It will be observed that the formation of the concept of CLS was far from complete when the first exemplar was built. A protracted struggle had to be fought on several fronts to objectify the concept in University procedures and attention had to be paid even to signage in order to ensure that the Collaborative Learning Space would prove to be a sustainable project. For this reason we believe that the seven actions that Engeström et al (2012) claim form an “expansive cycle” characteristic of concept formation fall short in taking reflection and evaluation as the final stage. In fact, Engeström observes that the “Helsinki Health Centre Strategy and Balanced Score Card” document for 2011-2013 refers to the relevant concept. We would see this as not simply *evidence* of the sustainability of the concept, but itself an important part of the objectification of the concept, an action which should have been anticipated in the “expansive cycle.” A concept is a unit of a social formation and cannot be said to exist until it has achieved a degree of stability within that form of life. Further, a concept is subject to modification in the course of its objectification which must be taken as part of the concept formation, and not simply the ‘registration’ of the concept.

Hall (2012) remarks that “Not surprisingly, innovations in teaching often collapse after few years of intense effort ...” and it is our experience that there is a huge difference between a good idea which turns out to be an illusory flash in the pan, and a concept which enters into the culture of the relevant institution, because it represents a viable solution to a real problem. Attention to the processes of instrumental and symbolic objectification is the key issue here. It may even be that only in the course of concretisation, meeting the various objections and counterproposals, etc., that the germ cell of the concept itself becomes clear.

Virkkunen observes (2012) that “A ratchet effect that enables cultural learning is created when a generalization or idea is objectified in an artefact. The artefact stays in place in the

community long enough to become a platform for future innovations.” Our experience has confirmed that instrumental objectification may have this effect, but we have also found that symbolic objectification (i.e., inscription in documents, laws, signage, literature, etc.) or practical objectification (i.e. normalisation of use in actions) can be decisive.

We have noted that although the oval table was created with the completion of the very first CLS, it was more than a year later before the oval table was recognised as the germ cell. When AB (2000) gave a lunchtime talk to staff on CLSs in October 2000, the audience questions focussed almost exclusively on the oval tables: where to buy them, how much they cost, what size, shape, etc., etc. It was only at that point that it became clear that the oval table was the “germ cell” of the CLS. But developments over the succeeding decade have showed that indeed the germ cell was the oval table, despite the fact that the table design continues to be refined to this day.

We said at the beginning that a concept is a problem-solution arising within some institution. Over time, this essential character of a concept becomes blurred as it is incorporated into the entire culture of a society, but we cannot agree with Bazerman (2012) who says that concepts “both identify the phenomena or objects that are *worth attention* and are to be reported, and also identify procedures by which particulars in a class are to be identified.” This is an abstract-empirical conception which cannot grasp the contradictory developmental process which generates new concepts.

On the other hand, we fully agree with Nersessian (2012) who sees concept formation in terms of problem-solutions and that technologies produced in the course of solving problems are crucial to the on-going process of conceptualisation.

We also agree with Hall (2012) that projects that create a new concept produce outcomes on a number of levels. In our case, the rooms themselves, university procedures, methods of design and project management, and modes of teaching and learning were all changed by the project. Everyone learnt from collaboration in the project and went on to support proliferation of the idea in diverse ways.

CONCLUSION

We have sought to clarify the conditions under which a new concept emerges and takes an on-going place within the discourse of a community, as well as the factors which tend to militate against the institutionalisation of a concept. We have chosen just one concept as a case study because of its inherent interest to readers of this journal.

A concept originates in a problem or in an opportunity which arises within the social practices of some institution, positing a new need, designating either the problem or a solution. But such a concept will remain “unreal” unless it is objectified. The most robust and enduring mode of objectification is instantiation as a material artefact, such as the masonry and furniture of a building as was the case here. But such an objectification supports a new concept only to the extent that novel forms of activity constitute and reconstitute the artefact as an exemplar of the concept. Thus the original problem-solving (Nersessian 2008) has to be continued by some sort of social movement, broadly so-called, which continuously affirms the ‘problem’ and consolidates the reality of the concept by continuously objectifying the ‘solution’, advocating for it and constituting it in practice.

But the objectification of the concept as an instance of itself is not the sole form of objectification. The use of the word which acts as a bearer of the concept and its sign, has to enter the language, and in particular has to enter the formal and objectified language of the institution in the form of signage and its use in the statutes, procedures and databases of the institution, thus ensuring an enduring place for the concept in verbal discourse. This

is important since if a concept is to be maintained, its meaning has to be embedded in the practices and knowledge of the entire institution.

We have not entered here into the conditions which led to the concept of designing rooms to support collaborative learning in universities on opposite corners of the globe in about 1999, 25 years after much the same issue had arisen in school education. Universities across the globe participate in a common discourse, and share the problems that arise within that discourse. We have chosen instead to focus closely on the microgenetic process by means of which this was realised in one institution. To quote Goethe again: “At all times, it has been only individuals who have furthered science, not the age” (Goethe 1964/1826).

Nonetheless the following observations could be made. Following upon the failure of Keynesian and Monetarist policies, the October 1987 stock market crash initiated a decisive turn away from macro-economic policies towards Micro-economic reform and corporate restructure as the strategy of choice of global capitalism. This penetrated the academy in number of ways.

Politically, microeconomic policies initiated a sustained campaign against centralisation and in favour of devolution in numerous aspects of economic and bureaucratic life, including both in the university itself and in educational theory. This delegitimised the large bureaucracies managing the universities and provided openings for criticism from outside the hierarchy. The new workplace training and change management industries also penetrated the universities and these people were much more innovative in their approaches to teaching and learning, which were often manifested in novel office design and communications, for example.

The model of student-as-customer did not favour collaborative learning in and of itself, but its critique of teacher-centred pedagogy provided an opening in which collaborative learning could occupy an attractive third position. In the “real world” of 1990s private enterprise, hierarchical chains of line management and sharp divisions between decision making and labour were out of favour, and firms were devolving authority and responsibility for outcomes from middle-management to self-managed teams of multi-skilled front-line workers. In this *Zeitgeist*, devolving responsibility for learning from teacher to students made perfect sense.

We believe that these factors contributed to the promotion of the idea of “collaborative learning.” A survey of academic journals using Google Scholar, shows that articles concerning “collaborative learning,” as a percentage of articles concerned with “learning,” remained at about 0.22% throughout the period 1965 to 1989 but rose to 4% through the 1990s. The global factors mentioned further contributed to the formation of a concept of Collaborative Learning Space, such that the concept emerged in 1999.

The main factor which militates against the institutionalisation of the concept is the need, characteristic of late modernity, for institutions to brand their activity and property. Very often, adoption of a term arising in another institution is a form of community which runs counter to the dominant spirit of competitiveness. In this situation, a concept is most easily maintained and proliferated if it is promoted as the exclusive product of a distinct organisation or movement which promotes it.

A tour of the teaching and library spaces at the University of Melbourne in 2011 shows a stunning diversity of built forms and fit-out, invariably oriented to the support of a wide variety of learning activities. This stands in sharp contrast to the position in 1999, typical of all universities across the world, of lecture theatres, laboratories and classrooms which objectified an out-dated teacher-centred, information-delivery mode of pedagogy. The

concept of Collaborative Learning Space has been mainstreamed at the University of Melbourne and entered as an integral part of the mainstream educational discourse of universities across the world.

Thus we have shown how a concept arises and develops and in doing so what a concept *is*.

REFERENCES

- Arnold, M. (1996). "The High-Tech Post-Fordist School." *Interchange* 27 (3 and 4), p. 225-250, New York: Springer.
- Bazerman, C. (2012), "Writing with concepts: communal, internalized and externalized," *Mind Culture and Activity*, 19(3), Philadelphia, PA: Taylor & Francis.
- Blunden, A. (2000) Building for Collaborative Learning, talk for staff at the University of Melbourne, <http://wayback.archive-it.org/2927/20120105030408/http://trs.unimelb.edu.au/archive/18Oct.html>, 18 October 2000. See also images at <http://wayback.archive-it.org/2927/20120105030406/http://trs.unimelb.edu.au/archive/cls2.html>.
- Chism, Nancy Van Note and Bickford, Deborah J. (2002) *The Importance of Physical Space in Creating Supportive Environments*, New Directions for Teaching and Learning, No. 92, Winter 2002: Jossey-Bass, Ann Arbor, MI, Wiley.
- Engeström, Y., Nummijoki, J. & Sannino, A. (2012), "Embodied Germ Cell at Work: Building an Expansive Concept of Physical Mobility in Home Care," *Mind Culture and Activity*, 19(3), Philadelphia, PA: Taylor & Francis.
- Goethe, J. W. v. (2006/1823) *Goethe on Science, An Anthology of Goethe's Scientific Writings, Selected and introduced by Jeremy Naydler With a foreword by Henri Bortoft*, Edinburgh, Floris Books.
- Goethe, J. W. v. (1964/1826) *Goethe: Wisdom and Experience. Selections by Ludwig Curtis*, New York, Frederick Ungar Publishing.
- Hall, R. & Horn, I. S.. (2012), "Talk and Conceptual Change at Work," *Mind Culture and Activity*, 19(3), Philadelphia, PA: Taylor & Francis.
- Leontyev, A.N. (1978) *Activity, Consciousness, and Personality*, Prentice-Hall.
- Marx, K. (1986/1857) "Method of Political Economy," *MECW* Volume 28, Lawrence & Wishart.
- Marx, K. (1996/1867) "Preface to the First German Edition of *Capital*," *MECW* Volume 35, Lawrence & Wishart.
- Nersessian, N. (2008), *Creating Scientific Concepts*, Cambridge, MA, The MIT Press.
- Nersessian, N. (2012), "Engineering Concepts: Modeling Practices in Conceptual Innovation," *Mind Culture and Activity*, 19(3), Philadelphia, PA: Taylor & Francis.
- Oblinger, Diane G. (2006) Ed., *Learning Spaces*, Lexington KY: Educause.
- Sweeney, Trudy (2010) "Transforming pedagogy through interactive whiteboards: Using activity theory to understand tensions in practice." *ACCE* Volume 24, Number 2, February 2010, Australian Educational Computing.
- Virkkunen, J. (2012), "Double stimulation in strategic concept formation – an activity theoretical analysis of business planning in a small technology firm," *Mind Culture and Activity*, 19(3), Philadelphia, PA: Taylor & Francis.
- Vygotsky, L. S. (1987) "Thinking and Speech," *Collected Works*, Volume 1, New York: Plenum Press.
- Vygotsky, L. S. (1994) "The Development of Thinking and concept formation in adolescence," *Vygotsky Reader*, Hoboken NJ: Blackwell.

Postscript

Commentary on Yrjö Engeström’s 7-step process of Concept Formation

1. What I *did* appreciate about Engeström’s paper was that he explicitly presents his concept of concept as “An **ideal-typical sequence** of epistemic actions in ascending from the abstract to the concrete.” This is profoundly correct, and is the first time I have seen this formulation apart from my video interview in January 2012. Further, Engeström is the only CHAT writer other than myself who has detailed this process of ascent from the abstract to the concrete. And he has done a job which is not half-bad.

2. Engeström claims that the concept is the **product** of a process of development, achieved when “a new stable form of practice” is arrived at. This is in contrast to Goethe’s observation that “German frequently and fittingly makes use of the word *Bildung* to describe the end product *and* what is in process of production as well.” This has the effect of reifying concepts as if they were things that once produced existed independently of the human activity which constantly reproduces them. I would rather say that concepts themselves are both process and product, since the only form of existence available to a concept is the line of development of actions it characterises.

3. Also, it is quite mistaken to suppose that the formation of a concept entails a once-for-all process of formation passing through these 7 distinct stages, which once completed remains stable. More likely the relatively stable form of practice is very soon disrupted and the process recapitulated, subsuming the previous process in further development of the entire concept. The process of concept formation is **interminable**.

4. Engeström’s claim is that this 7-step process is an ideal-typical sequence of epistemic actions characteristic of concept formation in the wild. Doubtless there are different understandings of “in the wild.” In the first place a distinction is made from the formation of artificial concepts by subjects in a controlled laboratory experiment. But apart from that it appears from the language of this formulation and its context, that what Engeström is describing is ideal-typical of the formation of a concept in an organised **intervention** by consultants who take their work to be concept-formation. I take this to be in the same category as concept-formation by scientists in the course of their work, as described in the articles of Nersessian and Hall and Horn, as well as the failed process of concept formation described by Virkkunen and Ristimäki in the same issue of *MCA*. This is valuable in itself, since it is professionals in the business of concept-formation who are the major readership, but for problems of social policy, political action, and cultural/historical criticism, a distinct process of concept formation in the wild needs to be recognised.

5. The most serious flaw in Engeström’s 7-point analysis is the complete omission of **objectification**. It seems that Engeström takes objectification such as the inclusion of his concept of “sit-to-stand” in the “Helsinki Health Centre Strategy and Balanced Score Card” document for 2011-2013 simply as *evidence* of the sustainability of the concept. It is, however, itself an important part of the objectification of the concept, an action which should have been anticipated in the “expansive cycle.” A concept is a unit of a social formation and cannot be said to exist until it has achieved a degree of stability within that form of life, something which is ensured only by means of objectification. Further, a concept is subject to modification in the course of its objectification which must be taken as part of the concept formation, and not simply the ‘registration’ of the concept. Otherwise, we would have to say that Leonardo da Vinci invented the helicopter. The further development of a concept beyond the point at which the ‘germ cell’ first appears relies on conflict between the developing concept and its objectifications. So

objectification plays a key role in both the stability and the ongoing development of the concept. That Engeström sees no significance in material, symbolic or practical objectification is further evidence that despite everything, Engeström still objectifies concepts.

6. Engeström’s presentation of the process in terms of 7 stages obscures the fact that in any real process of concept formation these stages are constantly **recapitulated** and overtaking one another. In particular, the formation of the germ cell may not be a single moment in the process, but may undergo a number of false-starts corresponding to misconceptions before settling into a more or less stable form, and even then may undergo refinement, qualification and further distinctions in later stages of the process.

7. The fourth, fifth and sixth actions seem to gloss over an important distinction. On the one hand there is the first discovery (possibly a more appropriate characterisation as compared to “constructing” and “modeling”) of the germ-cell, which then immediately becomes the focus for those immediately involved in the original problem-solving task referred to in action 1. But then, quite aside from any further experiment or operation (though perhaps this is exactly what is intended in the fifth action) there is the **proliferation** of the germ cell, which brings it under critique in a wider circle of situations than were envisaged by the initiators, and this feeds back to the beginning process and causes recapitulation of the production of the germ cell. This may already be implicit in actions 4, 5 and 6, but the significant distinction is that if a concept is to really exist, and not prove to be illusory, it must move beyond the circle of those who initiated it and enter into circulation. But this process inevitably turns out to be a significant new phase of development itself.

8. Finally, there is no room in the process of concept formation as described by Engeström for **misconception**. I take misconception to refer to misrecognition of the germ-cell, generally by means of an inessential attribute of the germ-cell being taken as essential. This is something quite distinct from a concept which later turns out to be inadequate or fail to resolve the original problem, since it refers to the misconception of the concept under formation. Consequently, it becomes one of the driving factors in the process of concept formation in itself.

9. Finally, returning to action 1, “questioning” perhaps over-subjectifies the starting point of concept formation. Concept-formation is essentially a subjective process, a process of subject formation, in fact, but its starting point is an **objective** one. For the process of concept-formation to begin there must be some group of people sharing some social position for which some unforeseen problem or opportunity arises, *before* the circumstances of this problem/solution can be subject to questioning. This is an archetypically objective process, inhering in the social structure or institution which is the site of the concept formation.

Appendix: Engeström’s 7 actions of Concept Formation

* *Mind, Culture, and Activity*, 19(3), July 2012, p. 288-289.

Ascending from the abstract to the concrete is achieved through specific epistemic or learning actions. Together these actions form an expansive cycle or spiral. An ideal-typical sequence of epistemic actions in ascending from the abstract to the concrete may be described as follows:

1. The first action is that of questioning, criticizing, or rejecting some aspects of the accepted practice and existing wisdom. For the sake of simplicity, we will call this action questioning.

THE FORMATION OF THE CONCEPT OF “COLLABORATIVE LEARNING SPACE”

2. The second action is that of analyzing the situation. Analysis involves mental, discursive or practical transformation of the situation in order to find out origins and explanatory mechanisms.
3. The third action is that of modeling a new explanatory relationship in some publicly observable and transmittable medium. This means constructing an explicit, simplified model of the new idea, a germ cell, that explains the problematic situation and offers a perspective for resolving and transforming it.
4. The fourth action is that of examining the model, running, operating, and experimenting on it in order to fully grasp its dynamics, potentials, and limitations.
5. The fifth action is that of implementing the model, concretizing it by means of practical applications, enrichments, and conceptual extensions.
6. The sixth and seventh actions are those of reflecting on and evaluating the process and consolidating its outcomes into a new stable form of practice.