

**Chapter 1 : Positive Perspectives on Parents and Families | Teaching Diverse Learners**

*Global Perspectives on Recognising Non-formal and Informal Learning: Why Recognition Matters (Technical and Vocational Education and Training: Issues, Concerns and Prospects) [Madhu Singh] on blog.quintoapp.com \*FREE\* shipping on qualifying offers.*

Gestalt theory[ edit ] Cognitive theories grew out of Gestalt psychology. Gestalt psychology was developed in Germany in the early s by Wolfgang Kohler [26] and was brought to America in the s. The German word Gestalt is roughly equivalent to the English configuration or organization and emphasizes the whole of human experience. However, the lights are not actually flashing. The lights have been programmed to blink rapidly at their own individual pace. Perceived as a whole, the sign flashes. Perceived individually, the lights turn off and on at designated times. Another example of this would be a brick house: As a whole, it is viewed as a standing structure. However, it is actually composed of many smaller parts, which are individual bricks. People tend to see things from a holistic point of view rather than breaking it down into sub units. Gestalt psychologists criticize behaviorists for being too dependent on overt behavior to explain learning. They propose looking at the patterns rather than isolated events. Two key assumptions underlie this cognitive approach: Gestalt theorists believe that for learning to occur, prior knowledge must exist on the topic. When the learner applies their prior knowledge to the advanced topic, the learner can understand the meaning in the advanced topic, and learning can occur Cognitive theories look beyond behavior to consider how human memory works to promote learning, and an understanding of short term memory and long term memory is important to educators influenced by cognitive theory. They view learning as an internal mental process including insight , information processing, memory and perception where the educator focuses on building intelligence and cognitive development. Today, researchers are concentrating on topics like cognitive load and information processing theory. These theories of learning play a role in influencing instructional design. In the late twentieth century, situated cognition emerged as a theory that recognized current learning as primarily the transfer of decontextualized and formal knowledge. Bredo depicts situated cognition as "shifting the focus from individual in environment to individual and environment". Learning through this perspective, in which known and doing become inseparable, becomes both applicable and whole. Much of the education students receive is limited to the culture of schools, without consideration for authentic cultures outside of education. Curricula framed by situated cognition can bring knowledge to life by embedding the learned material within the culture students are familiar with. For example, formal and abstract syntax of math problems can be transformed by placing a traditional math problem within a practical story problem. This presents an opportunity to meet that appropriate balance between situated and transferable knowledge. Lampert successfully did this by having students explore mathematical concepts that are continuous with their background knowledge. In this way, knowledge becomes active, evolving as students participate and negotiate their way through new situations. Constructivism learning theory Founded by Jean Piaget , constructivism emphasizes the importance of the active involvement of learners in constructing knowledge for themselves. Students are thought to use background knowledge and concepts to assist them in their acquisition of novel information. On approaching such new information, the learner faces a loss of equilibrium with their previous understanding, and this demands a change in cognitive structure. This change effectively combines previous and novel information to form an improved cognitive schema. Constructivism can be both subjectively and contextually based. To design effective teaching environments, it believes one needs a good understanding of what children already know when they come into the classroom. Kolb serve as the foundation of the application of constructivist learning theory in the classroom. In scientific areas in the classroom, constructivist teachers provide raw data and physical materials for the students to work with and analyze. Transformative learning Transformative learning theory seeks to explain how humans revise and reinterpret meaning. The emotions are often involved. Habits of mind influence our point of view and the resulting thoughts or feelings associated with them, but points of view may change over time as a result of influences such as reflection, appropriation and feedback. Educational neuroscience American Universities such as

Harvard, Johns Hopkins, and University of Southern California began offering majors and degrees dedicated to educational neuroscience or neuroeducation in the first decade of the twenty-first century. Such studies seek to link an understanding of brain processes with classroom instruction and experiences. It looks at what environmental, emotional, and social situations best help the brain store and retain new information via the linking of neurons and best keep the dendrites from being reabsorbed, losing the information. The s were designated "The Decade of the Brain", and advances took place in neuroscience at an especially rapid pace. The three dominant methods for measuring brain activities are event-related potential , functional magnetic resonance imaging and magnetoencephalography MEG. Researchers expected that new technologies and ways of observing will produce new scientific evidence that helps refine the paradigms of what students need and how they learn best. In particular, it may bring more informed strategies for teaching students with learning disabilities. Formal and mental discipline[ edit ] This section does not cite any sources. Please help improve this section by adding citations to reliable sources. Unsourced material may be challenged and removed. March Learn how and when to remove this template message All individuals have the ability to develop mental discipline and the skill of mindfulness, the two go hand in hand. Mental discipline is huge in shaping what people do, say, think and feel. Mindfulness is important to the process of learning in many aspects. Being mindful means to be present with and engaged in whatever you are doing at a specific moment in time. Being mindful can aid in helping us to more critically think, feel and understand the new information we are in the process of absorbing. Phillips and Jonas F. Soltis provide some skepticism to this notion. Their skepticism stems largely in part from feeling that the relationship between formal discipline and the overall advancement of the mind is not as strong as some would say. They illustrate their skepticism by opining that it is foolish to blindly assume that people are better off in life, or at performing certain tasks, because of taking particular, yet unrelated courses. Theory of multiple intelligences The existence of multiple intelligences is proposed by psychologist Howard Gardner , who suggests that different kinds of intelligence exists in human beings. However, the theory of multiple intelligences is often cited as an example of pseudoscience because it lacks empirical evidence or falsifiability.

**Chapter 2 : Enabling Informal Learning: Integrating Knowledge Management and Learning - Training Indus**

*Jan 1st, AM. Perspectives on Informal Learning: Cross-Disciplinary Concepts and A New Venue for Adult Education. Informal learning is a canonical concept in adult education but is used differently in other disciplines.*

It usually takes place outside educational establishments ; It does not follow a specified curriculum and is not often professionally organized but rather originates accidentally, sporadically, in association with certain occasions, from changing practical requirements; It is not necessarily planned pedagogically , systematically according to fixed subjects , test and qualification -oriented, but rather, either unconsciously incidental or consciously intended intuition, holistically problem -related, and related to actual situations and fitness for life ; It is experienced directly in its " natural " function of everyday life. It is often spontaneous and creative. It is a key component to an alternative learning system coined, Learning by Observing and Pitching In LOPI , [3] which is based on the learning methods observed to be common in many Indigenous American communities. History[ edit ] In international discussions, the concept of informal learning, already used by John Dewey at an early stage and later on by Malcolm Knowles , experienced a renaissance, especially in the context of development policy. Marsick and Watkins take up this approach and go one step further in their definition. Differences between informal and non-formal learning[ edit ] Main article: Non-formal learning As noted above, informal learning is often confused with non-formal learning. Non-formal learning has been used to often describe organized learning outside of the formal education system, either being short-term, voluntary, and having, few if any, prerequisites. Other perspective[ edit ] Merriam et al. He proposes three forms: These differ among themselves in terms of intentionality and awareness at the time of the learning experience. Drawing upon implicit processing literature, she further defined integrative learning as "a learning process that combines intentional nonconscious processing of tacit knowledge with conscious access to learning products and mental images" Bennett, , p. In American Indigenous communities[ edit ] People in many Indigenous communities of the Americas often learn through observation and participation in everyday life of their respective communities and families. Barbara Rogoff, a professor of psychology, and her colleagues describe the ways in which children in Indigenous communities can learn by observing and participating in community endeavors, having an eagerness to contribute, fulfilling valuable roles, and finding a sense of belonging in their community. This form of informal learning allows the children to collaborate in social endeavors, which grants the child the opportunity to learn by pitching in. An example is the process where children learn slash-and-burn agriculture by being present in the situation and contributing when possible. Many Indigenous communities provide self-paced opportunities to kids, and allow exploration and education without parental coercion. Collaborative input is highly encouraged and valued. Their roles as learner and expert are flexible, while the observer participates with active concentration. Many of them become herders by informal learning in observation. Informal learning for children in American Indigenous communities can take place at work where children are expected to contribute. Often in mainstream middle-class culture, success in school and work settings is gained through practicing competitiveness and working for personal gain. In order to achieve mutual respect in teachings, what is often relied on in Indigenous American culture is nonverbal communication. Children in this community learn about growing crops by observing the actions and respect adults have for the land. They learn that caring for their crops is vital for them to grow and in turn for the community to thrive. Similarly, when children participate in rituals, they learn the importance of being part of the community by watching how everyone interacts. This again needs no explicit verbal communication, it relies solely on observing the world around. Chillihuani culture does not explicitly verbalize expectations. Their knowledge is experienced rather than explained through modeled behavior for community benefit. The infant does not go far from the mother at any time. In this way, the child is encouraged to explore away from the mother and other family members who will still keep watch. As the child wanders he may come to a place that is unknown and potentially dangerous but the mother will not stop him, she will just watch as he explores. The lack of verbal reprimand or warning from an adult or elder enable the child to assimilate his surroundings more carefully. Formal education can be defined as a setting that is highly institutionalized, can be possibly

bureaucratic, while being curriculum driven, and formally recognized with grades, diplomas, or other forms of certifications. Informal learning often takes place outside educational establishments, and does not follow a specified curriculum and may originate accidentally, or sporadically, in association with certain occasions, although that is not always the case. Informal education can occur in the formal arena when concepts are adapted to the unique needs of individual students. Research and data [ edit ] Merriam and others state: Both formal and informal learning are considered integral processes for Virtual Human Resource Development Bennett, , with informal learning the stronger form. University of Virginia, For example, in the cause of language acquisition , a mother may teach a child basic concepts of grammar and language at home, prior to the child entering a formal education system Eaton, Sarah In such a case, the mother has a tacit understanding of language structures, syntax and morphology, but she may not be explicitly aware of what these are. She understands the language and passes her knowledge on to her offspring. Other examples of informal knowledge transfer include instant messaging, a spontaneous meeting on the Internet, a phone call to someone who has information you need, a live one-time-only sales meeting introducing a new product, a chat-room in real time, a chance meeting by the water cooler, a scheduled Web-based meeting with a real-time agenda, a tech walking you through a repair process, or a meeting with your assigned mentor or manager. Experience indicates that much of the learning for performance is informal The Institute for Research on Learning, , Menlo Park. Those who transfer their knowledge to a learner are usually present in real time. Such learning can take place over the telephone or through the Internet, as well as in person. The Learning Revolution Festival ran in October and funding has been used by librariesâ€”which offer a host of informal learning opportunities such as book groups, "meet the author" events and family history sessionsâ€”to run activities such as The North East Festival of Learning. Formal training programs have limited success in increasing basic skills for individuals older than age 25, therefore, these individuals rely mostly on on-the-job training. The largest increase in population for manual or low-skilled labor is in individuals who attended college but did not receive a degree. A recent collection of cross-sectional surveys were conducted and polled employers across the United States to gauge which skills are required for jobs which do not require college degrees. Business perspective [ edit ] The majority of companies that provide training are currently involved only with the formal side of the continuum. Summary [ edit ] Lifelong learning, as defined by the OECD , includes a combination of formal, non-formal and informal learning.

Chapter 3 : Learning theory (education) - Wikipedia

*Informal Learning at Work reflects the growing interest in changing the way the workplace encourages and enhances learning and professional development. Due to societal, economic, and technological developments, organisations face the pressure of growing knowledge-intensity and the need for innovations.*

For decades, knowledge management practitioners have strived to capture best practices and repeatable behaviors to ensure others can learn, adopt and even evolve these behaviors and practices to improve company and employee performance. There are four main tactics learning professionals are leveraging from traditional knowledge management strategies: Congregating people in person or virtually to share best practices, solve problems and continue the conversation after classroom programs. Setting up governance models around people sharing their best content and defining processes for promoting user-generated content into formal learning programs. Expanding learning assets to include external content and farming relevant content in support of a particular skill, knowledge area or learning path. Proactively capturing lessons learned of what to continue, what to stop and what to change to continuously improve results. Communities of Practice CoP have been a pillar of knowledge management strategies for decades. CoPs are groups usually formed around a common theme, such as a problem to solve, area of expertise, client, geography, gender, race, or role, led by a committed leader within the group. The ingredients of a successful community include: Facilitators can rotate to distribute the responsibility of leading a community, and, in fact, providing those new perspectives is very healthy for a community. It is tempting to have a learning professional facilitate communities but they are usually more successful if led from within the group. The facilitator needs to encourage active sharing of ideas, problems, solutions, successes and lessons. They need to do this activity outside of meetings as well. Team sites are a fantastic tool to collect and codify some of these areas but communities must be people-focused and therefore involve a social and human element, not just technology. Communities can also exist as an extension of classroom events to keep the attendees together for continuous sharing and learning from one another. These cohorts can extend discussion on a topic raised in the classroom event, provide opportunities to apply newly learned skills in context and enable peer coaching. Communities can live on forever or be temporary depending on the benefit to the group. User-Generated Content Sharing tips, tricks and best practices in social forums has been a long-standing knowledge management technique. This talk can be flagged and formally integrated into an effective communications program. Good criteria can include the level of relevance to role, skill, business or industry, a leading practice, furthers thinking on the right topic, aligns with organizational goals, promotes additional conversation, comes from a credible resource, among others. Content Curation Providing links to the wealth of external content that exists and continues to grow at a remarkable rate can be overwhelming to employees. Oftentimes, organizations have access to external content libraries because they are cost-efficient resources to provide employees access to a wide variety of topics and learning events. Employees need help narrowing down the best resources for them to develop their skills and managers need direction choosing the right resources to recommend to their teams. Making a case for this position can be achieved by showing time saved across the employee population. Curation will only become more important as the rate of content creation continues to explode. Highlighting curated content tied to a theme is a great way to continue to drive traffic to your learning portal and external learning resources. Project Debriefs Project debriefs or summaries have been a fundamental way for knowledge management professionals to capture and share learnings across disparate groups and regions. The act of reflecting and describing what happened and why is the crux of knowledge management. Establishing a process to capture this kind of knowledge on an ongoing basis is probably the single most important exercise a company can do to codify history and protect itself from knowledge loss. Debriefing and summarizing a project or initiative can be done by the project leader but, oftentimes, it is better to have an external facilitator from human resources or knowledge management lead the discussion to ensure all project team members can participate. This way the activity is guaranteed to happen as many times people move on to other projects or processes and do not make the time to capture lessons from what has just finished. If a project takes more than

a year from start to finish, it is very easy to forget the details of what happened, let alone why it happened. So, conducting this kind of exercise after major milestones can help ensure the knowledge and learning is not lost due to memory lapses or attrition. The structure of a project debrief can be simple: Describes the background and business problem. Describes what we did and how we did it. Describes what happened and what metrics we impacted. Usually, debriefs are documents or presentations but videos of project teams sharing their lessons and stories can be more impactful. Techniques like communities, user-generated content, content curation and project debriefs can further the learning goals of an organization.

**Chapter 4 : Difference Between Formal and Informal Learning**

*32 Learning Science in Informal Environments BOX Å¿ Perspectives on Informal Environments for Science Learning A variety of perspectives have been developed to understand, define, or evaluate science learning in informal settings.*

Implicit linkage of past memories with current experience Brief near-spontaneous reflection on past episodes, communications, events, experiences. Current experience A selection from experience enters the memory. Incidental noting of facts, opinions, impressions, ideas. Recognition of learning opportunities. Engagement in decision making, problem solving, planned informal learning. Future behaviour Unconscious effect of previous experiences. Being prepared for emergent learning opportunities. Eraut dismisses using the idea of self-directed learning because it can refer to what he has defined as formal and non-formal situations. However, so can his notion of deliberative learning. Indeed, implicit and reactive learning can also do so. It is probably more useful to look at learning as implicit, reactive and deliberative plus some other possible candidates and to explore interaction with context. Effectively, this would mean going well beyond a crude separation of contexts into informal and formal. The focus on these more substantive categories of learning allows us to connect with substantial traditions of thinking and practice and so develop a better appreciation of the experiences of learners and how their efforts might be enhanced. Tacit knowledge Another path into the notion of informal learning is to view it simply as implicit learning. However, as Eraut It may be that no knowledge is totally implicit or explicit. Six main situations were named: Tacit knowledge provides much of the basis for the way we interact with people and situations. Because this is not explored in any coherent way, such knowledge can be self-perpetuating and lead to behaviour that is inappropriate, or not the most productive. This is a compelling argument for the exploration of implicit learning and attempting to make tacit knowledge more explicit. Once revealed it can be tested and developed. Not unexpectedly there are major difficulties with this process see the discussion of experiential learning and reflection on action. We also need to recognize the reverse process “ that of making explicit knowledge tacit. Here we may learn and develop routines and habits to deal with situations. This can range from developing the ability to touch-type to being able to respond to situations quickly “ for example dealing with a medical emergency. In the case of the latter we may quickly fall into a pattern of actions without any significant deliberation. We respond to certain characteristics of a situation. From the brief discussion above it can be inferred that there is little mileage in simply renaming implicit learning as informal learning. First, there is a strong body of literature that deals explicitly and successfully with tacit knowledge “ and it would seem pointless to re-label a phenomenon that has a comprehensive literature. Second, the production of tacit knowledge involves implicit, reactive and deliberative learning. It is the interrelation of these modes of learning, and the mix of informal and formal education, that demands our attention. Situated learning This leads on to a fourth avenue of exploration “ viewing informal learning as an expression of situated learning see learning. A useful starting point is the notion of distributed cognition that gained some currency in the early s. People think in relationship with others and use various tools. Different cognitions will emerge in different situations. It can be seen as involving participation in communities of practice. Learning involves the whole person; it implies not only a relation to specific activities, but a relation to social communities “ it implies becoming a full participant, a member, a kind of person. In this view, learning only partly “ and often incidentally “ implies becoming able to be involved in new activities, to perform new tasks and functions, to master new understandings. Activities, tasks, functions, and understandings do not exist in isolation; they are part of broader systems of relations in which they have meaning. Lave and Wenger Gradually their engagement deepens and becomes more complex. They become full participants, and will often take on organizing or facilitative roles see our discussion of learning in associations. Knowledge is, thus, located in the community of practice. Four propositions are common to the range of perspectives that now come together under the banner of situated learning: High-level or expert knowledge and skill can be gained from everyday experiences at work, and in community or family. Domain-specific knowledge is necessary for the development of expertise i. Learning is a social process. Knowledge is embedded in practice and transformed through goal-directed behaviour. From

the above we can see how discussions of informal learning becomes linked with situated learning. The focus on communities of practice rather than dedicated learning environments; the interest in implicit learning; and the concern with relationship and conversation can lead us in that direction. We can approach learning that takes place in the community of practice that is the school as situated. Self-education and informal education Thus far, the argument has been that the notion of informal learning only has a limited use as a means of highlighting the extent of learning and education activity beyond the school. As a basis upon which to develop significant theory or to deepen practice it has little to recommend it. Indeed, it could be argued that it diverts attention away from what are more productive lines of enquiry. The question inevitably arises "can a similar argument be made around the distinction between informal and formal education? The key dimension, in many respects, is intention. People may not have a clear idea of the knowledge or skill they want to acquire, but they are committed to a process. This focus on intention in education allows us to explore different ways of organizing and articulating this. My own preference is to separate those approaches that depend upon the planning and sequencing of learning via something like a curriculum and those that are essentially dialogical or conversational and hence hold little prospect of pre-organizing if we to stay true to their nature. The former can be seen as formal, and the latter as informal, education. As John Ellis has argued it is best to see these as a continuum see below Street educators probably work more towards X; schoolteachers toward Y. This means both have a mixture of formal and informal practice. Put another way "both are facilitators, both are teachers. Much of the work of youth workers, for example, will be around conversation a. However, they will also be running small projects and groups, perhaps organizing residential b. Here they may sit down with those involved and talk through the programme. They decide together what they will do " they negotiate a curriculum. Workers may also be interested in water-sports. Here they may well organize a course on safety " where they decide the content and the process c Jeffs and Smith Educators that are largely working around conversation can be seen as informal, those working through set curricula are formal. One of the interesting features of this simple model is that it can be applied to self-education and self-directed learning. These terms tend to be used interchangeably " although the latter has gained significantly in popularity in the last decade or so. However, they are different. While both are concerned with conscious attempts to learn, self-education also carries with it a commitment to certain values like respect for others, the search for truth and so on. Self-directed learning need not. Part of the reason for this has been the eagerness of policymakers, academics and practitioners to substitute the learning for education lifelong learning rather than lifelong education; adult learning rather than adult education and so on " see lifelong learning. A focus on learning is important, but when it is at a cost of thinking about education and the values it carries , then a grievous disservice is done to all involved. Learning is a process that is happening all the time; education involves intention and commitment. Education is a moral enterprise that needs to be judged as to whether it elevates and furthers well-being. Four key areas of endeavour would appear to merit our sustained attention: Much that has been written about informal learning especially in the workplace is, perhaps, better approached as the revealing or unearthing of tacit knowledge, or the re-packing of expertise into tacit knowledge. These fundamental processes require our attention. The development of a range of accessible and usable opportunities for self-education is an obvious implication for policy and practice. Perhaps the most significant aspect here is the need to approach people as both learners and educators. This means moving away from seeing learners as consumers of different packages and opportunities, into viewing them as creators and constructors of learning. This entails cultivating communities animated by dialogue, democracy and respect for truth " and seeing education and learning not as individual acts but as an aspect of living together. A follow-on from the above, is the need to develop more democratic and elevating forms of group and organizational life. Not only do we need to attend to the significance of situated learning and distributed cognition, we also must look to building relationships and interactions that allow us to flourish and to grow, and to take responsibility for our lives and our part in the world. A further aspect is the need to focus attention on informal education and the place it has alongside formal education. Working with groups and associations, developing local forms of educating and learning, requires a special mix of dispositions, skills and knowledge. However, while it opens up some interesting possibilities, for example around tacit learning, it leads away

from others. We need to put education back in the equation. Further reading and references Coffield, F. Includes Coffield on the significance of informal learning; an excellent piece by Michael Eraut on non-formal learning – implicit learning and tacit knowledge in professional work; Field and Spence on informal learning and social capital; Barron et al on implicit knowledge, phenomenology and learning difficulties; Davies on the impact of accreditation; and Fevre et al on necessary and unnecessary learning. Ahmed Attacking Rural Poverty. How non-formal education can help, Baltimore: John Hopkins University Press. See, also, Coombs, P. International Council for Educational Development.

*Whereas formal learning happens in a training based organization, workplace, mobile devices, classrooms, online over the internet, and through e-learning portals, informal learning is based on practical and lifelong learning.*

Learning theory does not provide a simple recipe for designing effective learning environments; similarly, physics constrains but does not dictate how to build a bridge. Nevertheless, new developments in the science of learning raise important questions about the design of learning environments—questions that suggest the value of rethinking what is taught, how it is taught, and how it is assessed. The focus in this chapter is on general characteristics of learning environments that need to be examined in light of new developments in the science of learning; Chapter 7 provides specific examples of instruction in the areas of mathematics, science, and history—examples that make the arguments in the present chapter more concrete. We begin our discussion of learning environments by revisiting a point made in Chapter 1—that the learning goals for schools have undergone major changes during the past century. A fundamental tenet of modern learning theory is that different kinds of learning goals require different approaches to instruction Chapter 3 ; new goals for education require changes in opportunities to learn. After discussing changes in goals, we explore the design of learning environments from four perspectives that appear to be particularly important given current data about human learning, namely, the degree to which learning environments are learner centered, knowledge centered, assessment centered, and community centered. Later, we define these perspectives and explain how they relate to the preceding discussions in Chapters 1—4. *Brain, Mind, Experience, and School: The National Academies Press.* Consider the goals of schooling in the early s. Instruction in writing focused on the mechanics of making notation as dictated by the teacher, transforming oral messages into written ones. It was not until the mid to late s that writing began to be taught on a mass level in most European countries, and school children began to be asked to compose their own written texts. Even then, writing instruction was largely aimed at giving children the capacity to closely imitate very simple text forms. It was not until the s that the idea emerged of primary school students expressing themselves in writing Alcorta, ; Schneuwly, As in writing, it was not until relatively recently that analysis and interpretation of what is read became an expectation of skilled reading by all school children. In the early s, the challenge of providing mass education was seen by many as analogous to mass production in factories. Children were regarded as raw materials to be efficiently processed by technical workers the teachers to reach the end product Bennett and LeCompte, ; Callahan, ; Kliebard, This approach attempted to sort the raw materials the children so that they could be treated somewhat as an assembly line. Teachers were viewed as workers whose job was to carry out directives from their superiors—the efficiency experts of schooling administrators and researchers. In short, the factory model affected the design of curriculum, instruction, and assessment in schools. Today, students need to understand the current state of their knowledge and to build on it, improve it, and make decisions in the face of uncertainty Talbert and McLaughlin, Doing history involves the construction and evaluation of historical documents see, e. Then and Now Colonists were literate enough if they could sign their name, or even an X, on deeds. That literacy was the ability to hold a book and reel off memorized portions of basic American texts such as the opening paragraph of the Declaration of Independence, a part of the Gettysburg address, or some Bryant or Longfellow. With the coming of World War I, and the prospect of large numbers of men handling new equipment in foreign countries, Army testers redefined reading. Suddenly, to the dismay of men used to reading familiar passages, passing the army reading test meant being able to make sense, on the spot, of never-before-seen text. To achieve this vision requires rethinking what is taught, how teachers teach, and how what students learn is assessed. The remainder of this chapter is organized around Figure 6. Although we discuss these perspectives separately, they need to be conceptualized as a system of interconnected components that mutually support one another. Teachers who are learner centered recognize the importance of building on the conceptual and cultural knowledge that students bring with them to the classroom see Chapters 3 and 4. The information on which to base a diagnosis may be acquired through observation, questioning and conversation, and reflection on the products of student activity. A key strategy is to prompt

children to explain and develop their knowledge structures by asking them to make predictions about various situations and explain the reasons for their predictions. By selecting critical tasks that embody known misconceptions, teachers can help students test their thinking and see how and why various ideas might need to change Bell, a, b, ; Bell et al. The model is one of engaging students in cognitive conflict and then having discussions about conflicting viewpoints see Piaget, ; Festinger, Learner-centered instruction also includes a sensitivity to the cultural practices of students and the effect of those practices on classroom learning. Learner-centered teachers also respect the language practices of their students because they provide a basis for further learning. In science, one standard way of talking in both school and professional science is impersonal and expository, without any reference to personal or social intentions or experiences Lemke, ; Wertsch, In their narratives and arguments, students express both scientific and social intentions: If the responses of other students and the teacher to these multivoiced narratives are always keyed to the scientific point, it helps to shape the meaning that is taken from them and relates them back to the context of the unfolding scientific argument Ballenger, In standard science lessons, the scientific point in the talk of many students, particularly those whose discourse is not mainstream, is often missed, and the social intention is often devalued Lemke, ; Michaels and Bruce, ; Wertsch, ; see Chapter 7. In another example of connecting everyday talk and school talk, African American high school students were shown that many of their forms of everyday speech were examples of a very high form of literacy that was taught in school, but never before connected with their everyday experience Lee, , Like Proust who discovered he had been speaking prose all of his life, the students discovered that they were fluent in a set of competencies that were considered academically advanced. Page Share Cite Suggested Citation: If teaching is conceived as constructing a bridge between the subject matter and the student, learner-centered teachers keep a constant eye on both ends of the bridge. The teachers attempt to get a sense of what students know and can do as well as their interests and passionsâ€”what each student knows, cares about, is able to do, and wants to do. Chapter 7 illustrates how these bridges can be built. Knowledge-centered environments take seriously the need to help students become knowledgeable Bruner, by learning in ways that lead to understanding and subsequent transfer. Current knowledge on learning and transfer Chapter 3 and development Chapter 4 provide important guidelines for achieving these goals. Standards in areas such as mathematics and science help define the knowledge and competencies that students need to acquire e. The story Fish Is Fish Chapter 1 illustrates how people construct new knowledge based on their current knowledge. Knowledge-centered environments also focus on the kinds of information and activities that help students develop an understanding of disciplines e. This focus requires a critical examination of existing curricula. In history, a widely used history text on the American Revolution left out crucial information necessary to understand rather than merely memorize Beck et al. A concern with sense-making raises questions about many existing curricula. For example, it has been argued that many mathematics curricula emphasize â€”not so much a form of thinking as a substitute for thinking. The process of calculation or computation only involves the deployment of a set routine with no room for ingenuity or flair, no place for guess work or surprise, no chance for discovery, no need for the human being, in fact Scheffler, The argument here is not that students should never learn to compute, but that they should also learn other things about mathematics, especially the fact that it is possible for them to make sense of mathematics and to think mathematically e. There are interesting new approaches to the development of curricula that support learning with understanding and encourage sense making. Instructional units encourage students to build on their informal ideas in a gradual but structured manner so that they acquire the concepts and procedures of a discipline. The idea of progressive formalization is exemplified by the algebra strand for middle school students using Mathematics in Context National Center for Research in Mathematical Sciences Education and Freudenthal Institute, It begins by having students use their own words, pictures, or diagrams to describe mathematical situations to organize their own knowledge and work and to explain their strategies. In later units, students gradually begin to use symbols to describe situations, organize their mathematical work, or express their strategies. At this level, students devise their own symbols or learn some nonconventional notation. Their representations of problem situations and explanations of their work are a mixture of words and symbols. Later, students learn and use standard conventional algebraic notation for

writing expressions and equations, for manipulating algebraic expressions and solving equations, and for graphing equations. Movement along this continuum is not necessarily smooth, nor all in one direction. Thus, students may move back and forth among levels of formality depending on the problem situation or on the mathematics involved. Such questions represent another example of overlap between learner-centered and knowledge-centered perspectives. Older views that young children are incapable of complex reasoning have been replaced by evidence that children are capable of sophisticated levels of thinking and reasoning when they have the knowledge necessary to support these activities see Chapter 4. An impressive body of research shows the potential benefit of early access by students to important conceptual ideas. Young children have also demonstrated powerful forms of early algebraic generalization Lehrer and Chazan, Forms of generalization in science, such as experimentation, can be introduced before the secondary school years through a developmental approach to important mathematical and scientific ideas Schauble et al. Attempts to create environments that are knowledge centered also raise important questions about how to foster an integrated understanding of a discipline. Many models of curriculum design seem to produce knowledge and skills that are disconnected rather than organized into coherent wholes. The National Research Council Vast numbers of learning objectives, each associated with pedagogical strategies, serve as mile posts along the trail mapped by texts from kindergarten to twelfth grade. Problems are solved not by observing and responding to the natural landscape through which the mathematics curriculum passes, but by mastering time tested routines, conveniently placed along the path National Research Council, The progressive formalization framework discussed above is consistent with this metaphor. The curricula include the familiar scope and sequence charts that specify procedural objectives to be mastered by students at each grade: Yet it is the network, the connections among objectives, that is important. This is the kind of knowledge that characterizes expertise see Chapter 2. Stress on isolated parts can train students in a series of routines without educating them to understand an overall picture that will ensure the development of integrated knowledge structures and information about conditions of applicability. An alternative to simply progressing through a series of exercises that derive from a scope and sequence chart is to expose students to the major features of a subject domain as they arise naturally in problem situations. Activities can be structured so that students are able to explore, explain, extend, and evaluate their progress. Ideas are best introduced when students see a need or a reason for their use—this helps them see relevant uses of knowledge to make sense of what they are learning. Problem situations used to engage students may include the historic reasons for the development of the domain, the relationship of that domain to other domains, or the uses of ideas in that domain see Webb and Romberg, In Chapter 7 we present examples from history, science, and mathematics instruction that emphasize the importance of introducing ideas and concepts in ways that promote deep understanding. A challenge for the design of knowledge-centered environments is to strike the appropriate balance between activities designed to promote understanding and those designed to promote the automaticity of skills necessary to function effectively without being overwhelmed by attentional requirements. Students for whom it is effortful to read, write, and calculate can encounter serious difficulties learning. The importance of automaticity has been demonstrated in a number of areas e. The key principles of assessment are that they should provide opportunities Page Share Cite Suggested Citation: It is important to distinguish between two major uses of assessment. The first, formative assessment, involves the use of assessments usually administered in the context of the classroom as sources of feedback to improve teaching and learning. The second, summative assessment, measures what students have learned at the end of some set of learning activities. Examples of summative assessments include teacher-made tests given at the end of a unit of study and state and national achievement tests that students take at the end of a year. Issues of summative assessment for purposes of national, state, and district accountability are beyond the scope of this volume; our discussion focuses on classroom-based formative and summative assessments. Formative Assessments and Feedback Studies of adaptive expertise, learning, transfer, and early development show that feedback is extremely important see Chapters 2 , 3 , and 4. Given the goal of learning with understanding, assessments and feedback must focus on understanding, and not only on memory for procedures or facts although these can be valuable, too. Assessments that emphasize understanding do not necessarily require elaborate or complicated

assessment procedures.

*learning perspective. Recognition of competencies that people have acquired Many OECD and other Informal Learning is also gratefully acknowledged.*

We have structured this page around three basic questions: What is organizational learning? Is it individuals that learn in organizations, or can organizations learn themselves? From this exploration we suggest that there are particular qualities associated with learning in organizations. The page links into discussions on different pages of the encyclopaedia of informal education. Learning For all the talk of learning amongst policymakers and practitioners, there is a surprising lack of attention to what it entails. In Britain and Northern Ireland, for example, theories of learning do not figure strongly in professional education programmes for teachers and those within different arenas of informal education. It is almost as if it is something is unproblematic and that can be taken for granted. Get the instructional regime right, the message seems to be, and learning as measured by tests and assessment regimes will follow. This lack of attention to the nature of learning inevitably leads to an impoverishment of education. In order to start thinking about learning we need to make the simple distinction between learning as a product and as a process. The latter takes us into the arena of competing learning theories – ideas about how we might gain understandings. The former takes us to learning as either a change in behaviour or a change in our mental state. To explore these areas go to: Is it a process or a product? How might it be approached? Four different orientations to theorizing learning: The behaviourist movement in psychology has looked to the use of experimental procedures to study behaviour in relation to the environment. In other words, they were concerned with cognition – the act or process of knowing. In this orientation the basic concern is for human growth. We look to the work of Maslow and Rogers as expressions of this approach. It is not so much that learners acquire structures or models to understand the world, but they participate in frameworks that that have structure. Learning involves participation in a community of practice. Two developments have been highly significant in the growth of the field. First it has attracted the attention of scholars from disparate disciplines who had hitherto shown little interest in learning processes. A consequence of this is that the field has become conceptually fragmented, and representatives of different disciplines now vie over who has the correct model of organizational learning. The second development is that many consultants and companies have caught onto the commercial significance of organizational learning. Much of the effort of these theorists has been devoted to identifying templates, or ideal forms, which real organizations could attempt to emulate. Easterby-Smith and Araujo A helpful way of making sense of writing on organizational learning is to ask whether writers fall into one of two basic camps. The dividing line between them is the extent to which the writers emphasize organizational learning as a technical or a social process. Here we can again turn to Easterby-Smith and Araujo The technical view assumes that organizational learning is about the effective processing, interpretation of, and response to, information both inside and outside the organization. This information may be quantitative or qualitative, but is generally explicit and in the public domain. The social perspective on organization learning focuses on the way people make sense of their experiences at work. From this view, learning is something that can emerge from social interactions, normally in the natural work setting. Lave and Wenger and Wenger provide a fascinating example of the social perspective in action in their studies of apprenticeship and communities of practice. Here we will explore the notions of single- and double-loop learning and community of practice. We will also look at the notions of experiential learning and informal learning. Single- and double-loop learning and organizational learning. Double-loop learning involves interrogating the governing variables themselves and often involves radical changes such as the wholesale revision of systems, alterations in strategy and so on. We examine the notion of theories of action, single and double-loop learning, and the organizational orientations and practices linked to each. But is there really such a thing? We examine the current debates and conceptualizations and what some of the implications may be for those interested in developing the educative qualities of organizational life. This notion has been popularized by Lave and Wenger and Wenger We explore the idea that organizations may be a constellation of communities of practice. There are those who argue that it is

individuals, not organizations, who learn. Traditionally, the study of cognitive processes, cognitive development, and the cultivation of educationally desirable skills and competencies has treated everything cognitive as being possessed and residing in the heads of individuals; social, cultural, and technological factors have been relegated to the role of backdrops or external sources of stimulation. Salomon In this way of coming to understand our selves the body plays a crucial role. The skin becomes a boundary "everything that happens outside the wall it forms becomes the other" the world outside; what is inside is me "the world inside. People appear to think in conjunction or partnership with others and with the help of culturally provided tools and implements. Moreover, the arrangements, functions, and structures of these surrounds change in the process to become genuine parts of the learning that results from the cognitive partnership with them. They suggest that each member of an organization constructs his or her own representation or image of the theory-in-use of the whole. The picture is always incomplete "and people, thus, are continually working to add pieces and to get a view of the whole. They need to know their place in the organization. Hence, our inquiry into organizational learning must concern itself not with static entities called organizations, but with an active process of organizing which is, at root, a cognitive enterprise. Individual members are continually engaged in attempting to know the organization, and to know themselves in the context of the organization. Organizing is reflexive inquiry. There must be public representations of organizational theory-in-use to which individuals can refer. This is the function of organizational maps. These are the shared descriptions of the organization which individuals jointly construct and use to guide their own inquiry. Organizational theory-in-use, continually constructed through individual inquiry, is encoded in private images and in public maps. These are the media of organizational learning. Those interested in distributed cognition take this further. It can be argued that there are stronger and weaker versions of distributed cognition. Both ideas are often difficult to grasp as the notion of individual cognition is very deeply ingrained in much that is written about the area. In their review of individual and social aspects of learning, Salomon and Perkins comment: If organizations can learn, this does not mean that they learn very well. A strong theme in the literature on organizational learning is the weakness of the learning system involved. The learning of the collective suffers from a startling range of limitations. Some of these are equally characteristic of solo and collective learning entities. For instance, rare high-stakes events "marriage decisions in an individual or major shifts of direction in a business" are difficult learning targets because they do not occur often to disambiguate the lessons of experience, and because by the time they occur again circumstances may have changed substantially. Other problems of learning are exacerbated by the specifically organizational character of the learning. For example, different individuals and units within an organization may hold somewhat different criteria of success. Also, advocates of a policy are likely to interpret any difficulties with it as reflecting an insufficiently vigorous pursuit of the policy, while opponents interpret the same data as signifying a bad policy. Feedback about the results of organizational actions may be distorted or suppressed as people rush to protect their turf or to maintain a positive climate. In summary, organizations, like individuals, can learn. Many of the fundamental phenomena of learning are the same for organizations. However, organizational learning also has distinctive characteristics with reference to what is learned, how it is learned, and the adjustments called for to enhance learning. These derive from the fact that any organization by definition is a collective, with individuals and larger units in different roles that involve different perspectives and values, passing information through their own filters, and with noisy and loss-prone information channels connecting them. As a result, it seems likely that organizational as against individual learning has a number of characteristic features. It will tend to be: Situated and concerned with communities of practice. Further reading and references Argyris, C. *Theory, method and practice*, Reading, Mass: Offers fresh innovations, strategies, and concise explanations of long-held theories. A collection with a good overview and some very helpful individual papers. The opening section provides reviews and critiques, the second, a series of evaluations of practice. While not written directly into the organizational learning field, this book does provide a good discussion of the relevance of psychological theory to adult education. Includes material on humanistic psychology and the self-directed learner; the psychoanalytical approach; adult development; cognitive developmental psychology; learning styles; behaviourism; group dynamics; critical awareness. There is

helpful material on experiential learning and situated learning plus updates on the literature. Learning, meaning and identity, Cambridge: A fascinating expression of a social theory of learning that examines the integral role that communities play in our lives. Organizations are approached as constellations of communities of practice. Includes chapters on community, learning, boundary, locality, identity, participation, belonging, organizations and education. A theory of action perspective, Reading, Mass: Psychological and educational considerations pp. Legitimate peripheral participation, Cambridge: Organizational Learning and the Learning Organization, London: Distributed cognitionsâ€™ Psychological and educational considerations pp. A dialogic account of human nature, Hemel Hempstead: The art and practice of the learning organization, London:

*Singh surveys global perspectives on the importance of non-formal and informal learning, and of giving greater recognition to such forms of learning, rather than just that which occurs in formal education institutions, which traditionally tend to be the.*

Page 53 Share Cite Suggested Citation: Learning Science in Informal Environments: People, Places, and Pursuits. The National Academies Press. Yet a narrow focus on traditional academic activities and learning outcomes is fundamentally at odds with the ways in which individuals learn across various social settings: Adults faced with medical conditions typically learn what they can do to manage them from a wide variety of information sources. Families spend leisure time at science centers, zoos, and museums engaged in exploration and sense-making. Communities defined by linguistic and cultural ties maintain science-related practices and socialize their children into their routines, skills, attitudes, knowledge, and value systems as a part of their daily activities and rituals. For all these pursuits, the range of learning outcomes far exceeds the typical academic emphasis on conceptual knowledge. Across informal settings, learners may develop awareness, interest, motivation, social competencies, and practices. They may develop incremental knowledge, habits of mind, and identities that set them on a trajectory to learn more. The fundamental influence of early childhood experiences is increasingly recognized as providing the foundation for discipline-specific learning National Research Council, As the population ages, demographic shifts heighten the need to understand the ongoing role that science learning has in the lives of adults, including the elderly. The idea of lifelong, life-wide, and life-deep learning has been influential in efforts to develop a broad notion of learning, incorporating how people learn over the life course, across social settings, and in relation to prevailing cultural influences Banks et al. Lifelong learning is a familiar notion. It refers to the acquisition of fundamental competencies and attitudes and a facility with effectively using information over the life course, recognizing that developmental needs and interests vary at different life stages. Generally, learners prefer to seek out information and acquire ways of doing things because they are motivated to do so by their interests, needs, curiosity, pleasure, and sense that they have talents that align with certain kinds of tasks and challenges. Learning derives, in both opportunistic and patterned ways, from this breadth of human experience and the related supports and occasions for learning that are available to an individual or group. Learners need to learn how to navigate the different underlying assumptions and goals associated with education and development across the settings and pursuits they encounter. Life-deep learning refers to beliefs, ideologies, and values associated with living life and participating in the cultural workings of both communities and the broader society. Such learning reflects the moral, ethical, religious, and social values that guide what people believe, how they act, and how they judge themselves and others. This focus on life-deep learning emphasizes how learning is never a culture-free endeavor. Taken together, these concepts of lifelong, life-wide, and life-deep learning help bring into view the breadth of human learning and emphasize the broad reach of informal settings. Figure is a conceptual diagram that depicts the prevalence of lifelong and life-wide learning in formal and informal learning environments. Although there is significant variation for individuals, the diagram gives a rough estimation of the amount of time people routinely spend in informal nonschool learning environments over the life course. Thus, we explore a wide variety of places and social settings, which we refer to as venues and configurations. We defined a broad set of valued learning outcomes and examined the evidence related to each. Finally, we examined research on learners of all ages from very young children to the elderly. This diagram shows the relative percentage of their waking hours that people across the life span spend in formal educational environments and other activities. The calculations were made on the best available statistics on how much time people at different points across the life span spend in formal instructional environments. Graphic design, documentation, and calculations were conducted by Reed Stevens, with key assistance from Anne Stevens graphic design and Nathan Parham calculations. In this chapter we begin by discussing some general theoretical perspectives of learning and exploring how some prominent frameworks used in research on learning in informal environments build on them. We then describe an ecological model of learning

that provides multiple lenses for synthesizing how people learn science across informal environments. Building from the ecological perspective, we define the venues and configurations for learning and science learning strands that frame the remainder of this volume. Over a century ago, scientists began to study thinking and learning in a more systematic way, taking early steps toward what are now called the cognitive sciences. During the first few decades of the 20th century, researchers focused on such matters as the nature of general intellectual ability and its distribution in the population. In the s, they started emphasizing such 30 Learning Science in Informal Environments issues as the laws governing stimulus-response associations in learning. Be- ginning in the s, advances in fields as diverse as linguistics, computer science, and neuroscience offered provocative new perspectives on human development and powerful new technologies for observing behavior and brain functions. With richer and more varied evidence in hand, researchers have refined earlier theories or developed new ones to explain the nature of knowing and learning. Three theoretical perspectives of the nature of the human mind have been particularly influential in the study of learning and consequently in education: The relative influence of these perspectives over time has changed. Each emphasizes different aspects of knowing and learning with differing implica- tions for educational practice and research see, e. Behaviorism describes knowledge as the organized accumulation of stimulus-response associations that serve as components of skills Thorndike, People learn by acquiring simple skills which combine to produce more complex behaviors. Rewards, punishments, and other mainly extrinsic factors orient people to attend to relevant aspects of a situation and support the formation of new associations and skills. Cognitive theories, in contrast, focus on how people develop, transform, and apply structures of knowledge in relation to lived experience, including the concepts associated with a sub- ject matter discipline or domain of knowledge and procedures for reasoning and solving problems. One major tenet of cognitive theory is that learners actively construct their understanding by trying to connect new information with their prior knowledge. This theoretical approach generally focuses on individual thinking and learning. Sociocultural theory builds on cognitive perspectives, but emphasizes the cultural origins of human development and explores how individuals develop through their involvement in cultural practices e. In this view, individu- als develop specific skills, commitments, knowledge, and identity as they become proficient in practices that are valued in specific communities. From the perspective of educational practice, there are complementarities between cognitive and sociocultural accounts. This can be important for gauging where and how to initially engage a learner and what aspects of understanding require instructional support. Meanwhile, the sociocultural perspective can orient educators to patterns of participation and associated value systems that are important to learning. These may include analyses of expert practice in a particular domain such as how scientists communicate ideas to one another or forms of participation that are comfortable Theoretical Perspectives 31 or culturally important to learners e. For example, individuals learn to reason in science by crafting and using forms of notation or inscription that help represent the natural world. All three theoretical perspectives have had some influence on the design of informal environments that support science learning. As a result, a number of theoretical views are in play in the research and they are not particularly well integrated. This limits the degree to which the study of learning science in informal environments functions as a field. In Box we describe a few examples of perspectives on learning science in informal environments. We note that most draw on the cognitive and sociocultural traditions rather than behaviorism. Also, the list in Box is intended to illustrate the range of perspectives and is not exhaustive. An Ecological Framework for Understanding Learning Across Places and Pursuits A broad theory, or set of complementary perspectives, which could be refined through empirical testing, could help integrate the range of theories and frames currently in use as represented in Box and help generate core questions. The framework draws mainly from cognitive and sociocultural theories. Our proposal is consonant with other calls for using an ecological perspective for accounts of human development and learning that can accommodate a range of disciplinary perspectives as well as the diversity of life experiences in a global society Barron, ; Lee, It builds on a tradition of scholarship on the ecological nature of human development. Within the ecological framework, we describe three cross-cutting aspects of learning that are evident in all learning processes: Most of these perspectives have attempted to provide a broader frame for learning outcomes yet are compatible with the nature of learning in

informal environments. These frameworks are based on or framed in terms of cognitive and sociocultural theories. The model focuses on 12 key personal, sociocultural, and physical dimensions of learning. The model stresses visitor agenda, personal motivation, the sociocultural nature of learning, the importance of physical context, and long-term outcomes. It has been used to examine women negotiating the worlds of science and engineering, as well as race and gender in workplace settings Tate and Linn, ; Packard, Third spaces are outside the two typical spheres of existence: For telecommuters, for example, a coffee shop where they spend the work day could be construed as a third space. This framework is based on a large body of literature that considers the entry narrative of the visitor as a key factor in understanding motivation and learning from an informal learning experience. Family learning approaches are grounded in sociocultural theories and are currently transforming the way some museums and science centers are reorienting their missions, educational strategies, and experiences. Other perspectives have been used to inform evaluation studies of learning in informal environments. They are grounded in sociocultural theory and address the broader developmental needs of youth, in contrast to traditional deficit-based models that focus solely on youth problems, such as substance abuse, conduct disorders, delinquent and antisocial behavior, academic failure, and teenage pregnancy. Positive Youth Development describes six characteristics of positively developing young people that successful youth programs foster: Using each as a lens to examine learning environments enables us to tease out various factors at play in the learning process and better identify potential leverage points for improving learning. People-Centered Lens This lens sheds light on the intrapsychological phenomena that are relevant to the purposes and outcomes of science learning in informal environments including: Some of the relevant principles for the people-centered frame are encapsulated in How People Learn National Research Council, These principles include the influence of prior knowledge on learning, how experts differ from novices, and the importance of metacognition. Other principles highlight the learning benefits of having experiences that provide one with a positive affect and that help identify personal interests, motives, and identities that can be pursued. From early childhood onward, humans develop intuitive ideas about the world, bringing prior knowledge to nearly all learning endeavors. Children and adults explain and hear explanations from others about why the moon is sometimes invisible, how the seasons work, why things fall, bounce, break, or bend. Interestingly, these ideas develop without tutoring and are often tacit individuals may remain unaware of their own ideas. Yet these ideas often influence behavior and come into play during intentional acts of learning and education. Thus, a major implication for thinking about informal science learning is that what learners understand about the world is perhaps as important as what we wish for them to learn through a particular experience. Accordingly, efforts to teach should not merely be about abstractions derived in knowledge systems like science, but should also focus on helping learners become aware of and express their own ideas, giving them new information and models that can build on or challenge their intuitive ideas. Experts in a particular domain are people who have deep, richly interconnected ideas about the world. They are not just good thinkers or really smart. Nor are novices poor thinkers or not smart. Their ability to identify problems and generate solutions is closely connected to the things that they know, much more so than once believed National Research Council, Research has documented how expertise development can begin in childhood through informal interaction with family members, media sources, and unique educational experiences Crowley and Jacobs, ; Reeve and Bell, in press. One way that experts work with their knowledge is through metacognition or monitoring their own thinking. Much of this work is done in the head.

*Informal learning, on the other hand, gives control to the learners to choose the learning content from various sources, based on their interest, preferences, and relevance. These can be consumed at the learner's pace.*

Designing informal learning spaces using student perspectives Matthew Riddle, LaTrobe University, Australia Kay Souter, LaTrobe University, Australia This article describes the design of informal learning spaces at an Australian university that support students in the generation of knowledge. Recent learning space design projects at La Trobe have been informed by a number of pre-existing projects, including a small research project on student use of technologies, a national project on learning space design, and a significant curriculum renewal process at the university. It demonstrates the ways in which evidence based on student perspectives and principles developed through applied research in teaching and learning can inform real world learning space design projects in a higher education context. Introduction Although the obvious purpose of higher education is the development of independent thinking skills and domain knowledge by and for students, the design, control, and organization of learning environments is primarily the responsibility of administrators and teaching staff. With large group lectures, seminars, and tutorials still the predominant learning mode, the organization of space and time in higher education generally configures students as receivers of knowledge until the point of graduation, at which time they are expected to produce knowledge of their own. While the role of higher education is to transform students into critical thinkers who are capable of solving problems and building knowledge for themselves, we too often conceive of this process as knowledge transfer in a single direction, and not knowledge production and dialogue. As a result, learning space designs frequently reflect didactic modes of learning without paying adequate attention to other important modes. As Gibbons and Fried Foster , p. Gibbons and Fried Foster advocate a user-centered design approach founded in an understanding of the diversity of student experiences. In the Australian context, Jamieson et al. This article outlines a number of concurrent processes that led to and informed the design of a series of new informal learning spaces at La Trobe University in Victoria, Australia, to support students in generating their own knowledge. The purpose of unraveling these interwoven threads in a short case study is to reveal the importance of thorough applied research techniques that use student perspectives to establish an evidence base and in developing clear principles that have underpinned real world learning space designs in useful ways. Supporting Student Use of Technologies A number of key studies have looked at student use of technologies in higher education. Prensky , p 6. Clearly not all students are digital natives, and the concept that students themselves have fundamentally changed as a result of a more technologically rich environment remains in doubt. The ECAR Study Kvavik and Caruso, surveyed students across 63 institutions, drawing a picture of which particular technologies were used by students, their confidence and abilities in using them, and the contribution of these technologies to learner experiences. This and later ECAR studies have demonstrated the ubiquity of technologies in the lives of students as well as the diversity of their experiences with them. Following up on these studies, Riddle conducted a pilot study supported by the Australasian Society for Computers In Learning In Tertiary Education on the use of information and communications technologies by Australian students in their everyday lives. Certain key findings of the project related to learning space provision. Firstly, all of the students in the study reported owning laptops, but many were reluctant to bring them to the campus. At peak times, students found it difficult to get access to computers in the university library and reported that access to wireless internet was patchy and overly restricted. Students actively took up the topic of adequate provision of private study spaces during this study. During a focus group, one student expressed her frustration: The university is not providing for the number of people that actually attend here. When asked about a photograph of some small fixed tables and chairs outside the library, another student commented: I observe one thing, that many people when the library closes, they are doing some stuff on their laptop. I observed many times" Eddie, postgraduate Information Management student. In addition, the study demonstrated several things that seemingly had little to do with high technology. For example, students can struggle to plan their time effectively and they spend much of their time in workplaces, travelling, and in the home rather than on

campus. As a result, their diary entries showed that when they are on campus students are sometimes hurried and when they become frustrated by the lack of suitable study spaces they leave. These findings have informed the design of the learning spaces described below by providing evidence of the needs and desires of students for comfortable and functional study spaces. It conducted an international study tour and a series of staff-student forums, and produced a set of case studies and prototype designs, a practical guide to designing student-centered learning environments, and seven design principles for learning space design: These outputs, and in particular the seven design principles, are another key resource that has informed recent learning space design projects at La Trobe University. Particular principles applied in these projects are described in further detail below. Student perspectives were an important component of the SKG Forums. In one workshop on collaborative learning, a student from Victoria University described a classroom layout for group learning with tables "shaped so that students are facing each other" Souter et al. These ideas each made their way into the final set of design principles. Curriculum renewal and pedagogical designs using group work In La Trobe University embarked on an ambitious program of curriculum renewal known as Design for Learning. Recommendation 1 of this plan was that all undergraduate programs adopt six university graduate capabilities: La Trobe Faculties are currently mapping each of these graduate capabilities in all core subjects across all programs at cornerstone, midpoint, and capstone levels Spencer, Riddle and Knewstubb, The curriculum mapping process in the Faculty of Business, Economics and Law FBEL has identified the teaching and assessment of speaking and team work in all core first and second year subjects as particular areas for focus in curriculum renewal. While team work and communication are consistently identified among professional and accrediting bodies as highly desirable graduate capabilities, students are still not taking part in enough learning activities and assessment tasks of this nature. Both Faculties are making changes to the curriculum to incorporate more team work, but it is essential that learning spaces of appropriate qualities and quantities are available to support innovations in pedagogy. In recent years an institutional pilot was undertaken to extend the use of Enquiry Based Learning EBL , a student-centered approach involving structured group work to undertake an enquiry. This approach was subsequently adopted in the redesign of a small number of subjects in two Faculties. An evaluation of one of these subjects in the School of Management showed that the perception among students was that this unusual mode of learning was engaging and connected to real world work environments Burchielli et al. However, a comprehensive audit of all teaching spaces concluded that the university lacked adequate flat-floor learning spaces with appropriate furniture for collaborative learning, and had only a limited capacity to support informal group study. There was therefore a mismatch between the newly designed curriculum requiring students to work together and the learning spaces provided for them. Faculty-based Learning Commons Project In September La Trobe University began work on a new project to convert under-utilized spaces across the university for use as informal learning spaces. FBEL Learning Commons The project includes provision of amenities for students with disabilities and there is a long-term plan to make the space available for extended hours. The design emphasizes flexibility, comfort, and an appropriate blend of technologies with wireless internet availability in the outdoor seating area. Indoors, the group learning areas and lockers provide students with power for laptops and mobile devices. Eddy Spaces in Social Sciences The following section assesses the designs for these spaces against the design principles developed in the SKG Project [http:](http://) Comfort A central design principle is the comfort of the users of a learning space. This principle encourages the use of natural light, good acoustics, controlled temperature, and comfortable furniture. The design for each of the Faculty-based learning commons spaces involved all of these elements, through the combination of high quality banquette seating, ceiling fans for convective cooling and air circulation, heating, large windows, and acoustic shielding. These qualities are vital because there is evidence that students experience comfortable, functional, and aesthetically pleasing spaces as institutional interest in their experience and thus as a proxy for institutional respect Souter et al. This is in turn relates to student perceptions of institutional interest in their learning. The design of these spaces enable learners to move through corridors and find places to stop, for a moment or an hour, to read, check their email, or hold a conversation with a peer. Spaces that acted only as conduits before are becoming rich learning nodes in their own right. Careful thought has been put into the appropriate heights for horizontal benches and lockers to cater

to a diversity of learners. Power outlets have also been located in easy to reach places and have been embedded into table-tops in fixed group furnishings Figure 1. These spaces are less conducive to blending computer-based work with group discussion, reading and the use of tablet devices. For example, the designs provide for the use of Mobile Collaborative Workstations MoCOWs comprised of large LCD computer screens on trolleys that can be moved into place for students to work together in teams to edit documents or develop presentations Figure 1. All of the Faculty-based learning commons spaces have also been designed with plenty of room to move and with furnishings that can be easily moved by students to create new possibilities. For example, students can reconfigure the furniture in the FBEL learning commons to support multiple groups, one large group, or a series of private study areas. Spaces should be able to accommodate as many of these activities as possible, without the need for time-consuming reconfiguration. Evaluations are currently underway for these new spaces and usage results will be reported in future work. At the time of writing, the informal learning spaces described above have recently been completed and are in high use. They have also been used to influence other formal and informal learning spaces being developed in the university.

**Conclusion** This article has described the design of new learning spaces that arose from applied research projects that incorporate institutional and stakeholder perspectives and, in particular, those of the student. Future work will describe the use of these spaces and evaluate them against these principles. Workshops conducted by the authors have indicated a genuine interest in learning about these experiences and theories, and it is intended that this work should continue. The challenge of designing spaces that are a good fit for the culture of an institution, learner-centered, and informed by sound pedagogy is one that all higher education institutions face. While this piece describes a particular set of informal learning space design projects within an Australian context, the approach taken in this work could be applied to the design of learning spaces in other universities. We have argued that current practice too often ignores student perspectives and reproduces a physical environment that is familiar but less suitable for active learning, peer learning, and learning supported by technologies that students prefer to use. By refocusing attention on the development and adoption of design principles based on suitable evidence and up to date research on where and how students learn, universities can begin to design informal learning spaces with active learners in mind. All images were authored by Baldasso Cortese Architects. Just tell me what to do: Retrieved April 19, from <http://www.journals.sagepub.com/doi/10.1177/1539310114263801>; The Journal of the Learning Sciences 14 2 , Designing collaborative learning places: Psychological foundations and new frontiers. *New Directions for Teaching and Learning* 92 Winter , Retrieved February 2, from <http://www.sagepub.com/doi/10.1177/0898264313500001>; Place and space in the design of new learning environments. *Higher Education Research and Development*, 19 2 , Are they really digital natives? *Australian Journal of Educational Technology* 24 1 , Concepts for the Modern Learning Environment pp. ECAR study of students and information technology, Retrieved November 8, from <http://www.ecar.edu/2013/01/08/ecar-study-of-students-and-information-technology/>; A comprehensive learning space evaluation model: Final Report , Swinburne University. Space, time, and curriculum in undergraduate physics and management. *Digital natives, digital immigrants. Part 1, On the Horizon*, 9 5 , 1-6. ICTs in the daily lives of Australian Students: Retrieved April 21, from <http://www.ict.edu.au/>

**Chapter 9 : Informal learning - Wikipedia**

*Informal learning should no longer be regarded as an inferior form of learning whose main purpose is to act as the precursor of formal learning; it needs to be seen as fundamental, necessary and valuable in its own right, at times directly relevant to employment and at other times not relevant at all.*

February 23, Brendan Cournoyer Informal vs. In his book, *Informal Learning: With the formal learning bus, "the driver decides where the bus is going; the passengers are along for the ride. What Is Formal Learning?* Formal learning programs are typically synonymous with full-scale learning management systems LMS , with courses and curricula mapped in a very structured way. As a result, content is generally created by a specified group of instructional designers and trainers. The content development process usually lasts longer with formal learning programs, as those involved are often tasked with creating long, thorough presentations and publishing via a potentially complex LMS tool set. Content and learning materials can be delivered via a traditional class room training model, complete with lectures, required reading and scheduled testing. Live webinars and screen-sharing technology can also be used so that remote learners can attend the required sessions. Formal learning is a popular choice for companies that wish to have more control over the learning experience of their employees. There are a variety of LMS options to choose from, each with varying levels of price, support, functionality and flexibility. *B2B Sales Has Changed: Informal learning programs* , on the other hand, provide a lot more flexibility in the way content is both created and consumed. By removing the formality of a full-scale LMS, companies are usually able to create more content quickly and deliver it to their audiences in the way that makes the most sense. The idea here is that rather than limiting the responsibilities of content development to a few instructional designers, subject matter experts from across the organization can now become part of the process. Since anyone can create learning resources quickly and easily, more content can be developed by those who best understand the needs of the learners. Informal learning allows companies to save time on tedious live training sessions that are associated with many though not all formal programs and tend to cut into employee productivity. In other words, a well-developed informal learning program provides information to learners anytime, anywhere. *How to Decide Between Informal vs. Is it difficult to leverage the expertise of others in the company? Do you have trouble getting timely messages out quickly? How often does certain content need to be updated? Audience* " Are live formal training sessions wasting too much time? Are the sessions having the desired effect? Do learners have trouble finding follow-up information when they need it? *Tracking and Reporting* " How many people need to generate reports? Do you need more or less control over required courses? What exactly do you need to track? Hopefully that helps clear up the basic differences between formal and informal learning. Learn more about training best practices: