iMEdTrust | Enhancing Global Health by Transforming Medical Education

iMEdTrust's Core Educational Documents

Table of Contents

iMEdTrust's Curriculum:
Building on the past; Departing from the past

1. Introduction

The notion of "curriculum" is widely used in education. Traditionally, curriculum was defined in terms of an educational program's inputs: the content, methods and assessments it provides. Limited attention was given to the consequences of these efforts. Gradually, regulators and educators are coming to define curriculum in terms of its outcomes, as seen in the learners' capabilities and achievements. We consider this trend highly desirable. It forms the basis of our planning.

A central focus of our initiative is devising and assessing educational approaches that are meant to help learners fulfil both required and desired outcomes in ways that are optimally effective and efficient at both the program and individual student levels. Toward these ends, we are taking a fresh look at curriculum. For some observers, the combination of all the elements of our educational program may be regarded as innovative, even radical. However, when viewed in terms of its individual parts, we are largely replicating and adapting what some others have been doing. Parts of our curriculum have been initiated, evaluated and refined in other, progressive medical schools. We are indebted to many people for their innovative work and research, which is helping guide what we are setting out to do.

Our institutional goals include creating learning approaches that can be used by others in highly varied healthcare, national and cultural contexts, especially in economically constrained settings. Toward these ends we are developing resources that support; i) processes involved in fostering individualised, lasting learning, and ii) content that is appropriate to the outcomes needed in varied contexts, as well as for our evolving healthcare environment.

The processes we emphasize help ensure that students master learning outcomes needed universally in the medical profession, as well as specific outcomes needed by each separate learner, according to their backgrounds, readiness and intended work settings.

Our key processes (see Table 1) are:

- Learning-focused, real-work-oriented, with clinical and research placements, largely in medically underserved areas, domestically and internationally;
- Individualized, technology-supported, guided self-directed learning;
- Educator-facilitated and learner-facilitated small group discussions;
- Educator-facilitated, learner-facilitated, and individual simulation-based learning;
- A high emphasis on accurate self-assessment, a foundation for continuous development;
- Personal mentoring;

- Continuous, multi-level formative assessment, including constructive feedback;
- Preparation for summative assessments (if any are required by regulators).

Our key content elements are summarized in Table 1. After the Table, our *processes* are explained in Part 1 of this Curriculum presentation, and our *content* is explained in Part 2.

The innovations we propose are supported by established and emerging educational, psychological, and brain sciences (Appendix G, Relevant Publications), and by many respected authorities (Appendix I, Schedule 1). Many of our approaches are substantial departures from conventional educational practices, which have not evolved to reflect evidence that has accumulated since those practices were established. Along with others, we are persuaded that there are many legacy educational traditions that are in need of being modernized.

In many areas of human endeavour, people tend to be slow to give up established assumptions, beliefs and practices. Medical education, in general, has its share of people who resist educational change. Although there are now some appealing examples of constructive, evidence-supported innovations to be found in some medical schools, many of these innovations are incomplete. Too often they are being kept isolated, while other parts of the educational program remain untouched by the innovators' efforts. Also, many schools remain dominated by traditional practices. We're not aware of any medical school in which needed, evidence-supported innovations are being pursued as comprehensively as we are doing.

In medical and other spheres of education, research has found strong but unplanned influences on learners, producing unintended outcomes. Some of those outcomes are the reverse of what was wanted by the curriculum designers. For example, the curriculum planners may want to promote an enlarged interest in general practice (Primary Care) among the school's students. But, some of the dominant, sub-specialist role models to whom the students are exposed during their clinical learning are disparaging toward general practice (GP) careers, contributing to some students avoiding that choice. Such contrary, unintended influences, which aren't rare, have come to be called the "hidden curriculum". Our Educator Development Program (EDP) is partly motivated by our determination to avoid having competing messages within the curriculum that result in undesired outcomes.

To help make the many parts of our curriculum understandable, we've isolated the 10 most important "processes", and 10 "content" elements, which, together, comprise the core of our overall plan, as summarized In Table 1. In the table's left column we list our main elements that are departures from traditional practices. On the right we identify the approaches that can be found in the fairly large subset of medical schools that remain "conventional", at least in the area of that particular process or content. These conventional approaches became common worldwide in the decades following publication of the 1910 Flexner Report.

Each of our approaches is elaborated upon in the pages that follow Table 1. On the Internet, each left-column entry provides a direct link to the explanation of that item. On the pages that follow we summarize the main principles and practices that will be the foundation of our curriculum. These will be the starting point for the detailed planning, adaptation, customization, and research that will be done by us and our future colleagues. These processes will guide the shaping and refining of our programmes so that they are optimally adapted to the settings and circumstances of each of the schools in our Network.

NOTE: Each of the elements of our curriculum will need considerably more detailed development than is provided here. As a design intention, we want our incoming faculty to be centrally involved in the development and ongoing evolution of those details.

We are persuaded that our students and their patients will be best served if we assure two key conditions in the development and maintenance of our curriculum:

- Our incoming faculty and students will have a full understanding of and a commitment to the guiding principles of our institutional mission, so that the curriculum details consistently support this mission.
- The faculty and students will come to feel that they are genuinely co-creators of the program we offer, in which they will be participating. We want them to feel a full sense of "ownership" of, and be dedicated to helping ensure that we succeed in achieving the highest of standards in the contributions we make.

Table 1: *Processes & Content* in Medical Education

	iMEdTrust's Approaches	*vs. "Conventional" Approaches*
Educational *Processes*		
2a	Evidence-supported approaches	Mostly tradition-based approaches
2b	Students & faculty are selected with great care	Selection is often inconsistent in its areas of focus and degrees of care
2c	All educators are well prepared	Many educators are not well prepared
2d	Students are helped to be and remain "mature" learners	Rare emphasis on becoming lifelong learners, or on making needed changes in practice
2e	Clearly defined mission, with consistent goals & "culture"	There are inconsistencies; may result in having a "hidden curriculum"
2f	Non-productive stress is minimised	Excessive non-productive stress
2g	Learners are consistently "active"	Learners are often kept "passive"
2h	Main approach is *Adaptive Education*	Mostly standardised ("one-size-fits-all") education
2i	Learning events are based on small groups & individual experiences	Considerable time spent in lectures and other large group (impersonal) events
2j	Optimised uses of technologies	Limited use of appropriate technologies
Educational *Content*		
3a	Dominant focus on primary care	Main focus on secondary & tertiary care
3b	Emphasize wellness promotion	Emphasize interventional care
3c	Clinical & fundamental science learning are integrated, throughout	Clinical and fundamental science learning are largely kept separate
3d	Behavioural & social sciences are integrated into all learning experiences	Behavioural & social sciences are offered in a few, separate courses
3e	Relationship & communication skills are integrated throughout	Limited, isolated focus on relationship & communication skills
3f	Inter-professional & collaboration (team) skills are emphasised	Minimal attention to inter-professional & collaboration skills
3g	Emphasis on serving the under-served	Limited attention to the under-served
3h	Social determinants of population & global health are emphasised	"Upstream" factors in understanding health gets limited, if any, attention
3i	Social accountability & economic sensitivity are central concerns	Social accountability & economic sensitivity are rare or marginal concerns
3j	Students are prepared for educational and community leadership	Leadership gets limited, if any, attention

iMEdTrust's Curriculum; Part 1: Educational Processes

a. Evidence-supported Approaches

We have done our best to learn from what is or is not working in other schools and from what is available from systematic research. (See Appendix H for a list of publications by our staff, our advisors, and many others, from which we formed the basis for our ideas and plans.) Like some other medical schools that were created during the past half-century or so, we are seeking to make a fresh start (not merely replicating the past). The following are 3 key elements of our way of making a "fresh start":

We are not part of an existing institution. We are choosing to rely on evidence, not tradition, as our primary guide to the approaches we are pursuing. We want to invent, not inherit, our processes and approaches, within the boundaries permitted by our program's regulators. Toward these ends, we have chosen to not be part of an existing university or other established educational program. We are persuaded that this is a necessary condition for having a full opportunity to create significant departures from outdated curricula and practices of the past, and to pursue our philanthropic commitment to create a self-sustaining medical education resource platform that may be widely adapted and adopted by others. In preparation, we presented our intentions and approaches to senior representatives of the General Medical Council (GMC), our regulating body). They assured us that there is no reason at this time to keep us from moving forward with our plans as described here.

Our faculty-selection process. Commonly, medical school faculty members are selected primarily for their expertise as clinicians and/or their accomplishments as researchers. Their preparation for, and identity as educators, as well as their experiences and achievements in the educational domain are typically secondary considerations, if they are considered at all. Our faculty selection process will be different from this, and more comprehensive than usual. (Please see Section B, below, for a fuller explanation.)

Our faculty-preparation process. Commonly, medical schools give limited, if any, attention to educational expertise when recruiting faculty members. Only a minority of medical faculty members, internationally, who are assigned educational responsibilities are expected to have had significant preparation for those responsibilities. At iMEdTrust we are giving an unprecedented level of attention to the preparation of all our faculty members to ensure that we have a consistent set of values, attitudes, approaches, skills, and goals in support of our non-conventional educational program. We are determined to avoid the situation found in some programs, which have implemented new educational programs that then flounder because of insufficient faculty preparation. In some medical schools, for example, problem-based learning (PBL) was mandated without ensuring that all assigned group leaders were adequately ready for those responsibilities. With insufficient preparation, some faculty facilitators engaged in their familiar practice of giving

presentations, rather than fostering active learning, even though they were now working with small groups. (Please see Section C, below, for more explanation of this important component of our program.)

b. Students and faculty are selected with great care

Selection decisions are among the most important decisions that an organization makes. We will invest a substantial amount of time and effort in selecting our faculty members and students. Faculty selection can be highly influential on the character of an educational program. We want those who will be our faculty to be highly informed in advance about our institutional culture, our mission, and our educational processes, so that they can make well-informed decisions as to whether they will fit comfortably in our program. And, we will make sure to learn about our interested candidates' past evidence of educational interest, innovations, and reactions to evidence of the need for educational changes.

We will do our best to find and cultivate educators who:

- Value education expertise as a core component of their own career identity;
- Are committed to achieving and sustaining high standards in all their professional work, including their work as educators;
- Are effective listeners, humble, and collaborative in their ways of working with others;
- Exemplify empathy, a scientific approach to decision-making, and professionalism;
- Are capable of earning and sustaining the trust of their learners, patients, and others;
- Adapt appropriately to each learner's uniqueness and are non-judgmental toward others who are different from themselves;
- Are intrigued by well-reasoned and well-supported new ideas, not resistant to them;
- Are dependable, supportive advocates for their students (never their adversaries);
- Appreciate the humour in life and learning (and are able to laugh at themselves).

Much as we do when functioning as clinicians with patients, we will do a thorough "diagnostic workup" of faculty and student candidates. We will pay close attention to their relationship and communication styles and skills, and to their approach to working as members of collaborative teams. And, prior to being selected, we will expect them to join parts of our Educator Development Program (EDP), see next), to give them a taste of our educational approaches in action, and to give us an opportunity to experience them functioning in our context. We want our selection process to involve well-informed choices on both sides of the decision.

All Educators are well prepared

All faculty members (and many students) will join our Educator Development Program (EDP). The EDP is iMEdTrust's intensive and extensive set of experiences for helping our faculty (and some students) learn about and be effective, consistent contributors to our culture and educational approaches. As mentioned, we consider this a vital component of our "fresh start" to our educational program development. Our EDP is a core feature of our overall program, and is likely without precedent in medical education. We will make a large investment in helping our faculty members prepare for their educational responsibilities, and to continue growing in those roles.

We will seek to ensure that all faculty members have a well-informed commitment to our program's goals, mission, and approaches, many of which will likely be new and different for some of our faculty candidates. We want them all to understand and be committed to, as well as have the skills, attitudes, and personal characteristics needed for pursuing our program's goals and approaches. During their participation in the Educator Development Program (EDP) the faculty will experience the learning atmosphere, communication and relationship styles, and overall culture that we want them to support in their work with students, and to help reshape and improve over time.

Becoming educators in our Partner Medical Schools will begin with personal experiences of our educational principles in action. High quality medical education and clinical practice, in our view, are built on a foundation of well-conducted interpersonal, emotionally meaningful events. Being effective role models and helping others achieve high standards requires self-awareness and direct, extended experiences. Such expertise can't be developed or refined from only (or mainly) cognitive experiences, as tend to be the approaches in some current faculty development programs. Gaining a deep understanding of our mission and processes takes direct, emotionally as well as cognitively meaningful engagement with our core principles in action, as follows;

iMEdTrust's central educational principles and processes

The 5 dominant learning-event types in iMEdTrust's educational programs will be:

- one-to-one mentoring; small-group, collaborative learning; individualized, technology-supported, guided self-directed learning; supervised and independent work, individually and in groups, in the simulation centre; and participating for extended periods as members of established clinical care teams and, at other times, as members of active research teams. (Although many members of the clinical and research teams who supervise our students will be part-time iMEdTrust faculty members, they will participate in our Educator Development Program (EDP), just as our full-time faculty do).
- Comprehensive information about all learners' experiences and their performance will be continuously assembled and reviewed throughout their participation in our educational programme. This growing, rich body of information will be fully open to the learners and their educators. These data,

including assessments, will enable nuanced "diagnostic", "formative" and "summative" decision-making. (Also, in anonymized form, this information will contribute to our on-going program of health professions education research.)

- We will not assign conventional grades (e.g., A, C; 93, 78) or use formal, high-stakes examinations, except as may be required by our regulators. (See the explanation in our Dictionary.)
- We will not have predetermined cut-off times for "completing" courses or fulfilling goals. No positive or negative value judgments will be assigned to a student who takes less or more time to reach expected Learning Outcomes (within reasonable limits). Each learner's performance in relation to the expected outcomes, not the clock or the calendar, will determine when end points have been reached (except for those few performance tasks for which speed of execution is a core part of the competence involved).
- We will *not* focus on the learners' capacities for assimilating and reproducing information from memory. In instruction and assessment, the learners' approaches to identifying and managing relevant information, and their effective use of information-search technologies, will be emphasized.

To the maximum extent possible, the responsibilities for learning will be shifted to the learners. The faculty will serve primarily as guides, coaches, mentors, facilitators, and role models, not as information-dispensers.

Educator-student relationships will be models of the supportive, trust-based, considerate, nurturing connections we want our learners to have with their current and future patients. The students should experience their educators as their unequivocal advocates.

In preparation for becoming effective inter-professional health team members, students will be encouraged to have collaborative and mutually supportive relationships with each other. Given the wide range of prior experiences we expect will be found among our students, some of whom will even have had rich backgrounds in some aspects of health care, we anticipate that many students will have mentoring relationships with other students. Some of that mentoring will flow in both directions, since there will be differential levels of readiness and accomplishment among different students in different domains. For these and other reasons, the students will be encouraged to participate in some aspects of the Educator Development Program (EDP). And we will avoid practices that can produce a sense of competition among learners (especially such hurtful, unjustified practices as grading on a curve, posting grades, and giving out awards). We want to help our students deeply understand that becoming highly accomplished and being contributory to others can be their own rewards.

We want our educators and our learners to have a deep understanding of the difference between "learning about" something (say, professionalism) and "becoming" that something. We will cultivate professionalism and other desired qualities by creating a sense that our students are authentically in the process of

becoming professionals from the first day of medical school. (For more about this, see "NOTE", below.)

Effective communication and other relationship skills are considered central parts of all educational encounters, whether with educators, patients, peers, or others, and will be important elements of ongoing self-assessments and formative assessments. Learning experiences will promote reflection and self-assessment, which we see as foundational elements of "mature learners". These processes will be emphasized throughout. We consider them as core requirements for becoming professionals who continue learning and changing, as needed, throughout their careers.

Two additional, key features of our Educator Development Program (EDP):

- Any of our faculty who want their learning in the domain of medical education to be systematic and scholarly will have the opportunity to pursue a Master's level or a Doctoral level degree in Medical Education Leadership;
- Our students will be encouraged to participate in any aspects of the EDP that are of interest to them. Students who want to do so, in preparation for future leadership responsibilities, will be encouraged to pursue our Master's or Doctoral program in medical education leadership, either in parallel with their medical studies or subsequent to them.

NOTE: Participation in iMEdTrust's EDP is one of many examples of ways we are seeking to create a culture in which the usual boundary line between being a student and being a faculty member will be regarded as permeable. We want our students and faculty to regard themselves as colleagues who are at different stages along the same continuum. If our recruiting and EDP programs are successful, our faculty and students will regard themselves as continuous learners.

Some of our students may well be more accomplished than some of our faculty in some areas (in or out of medicine). In keeping with the collaborative team model that will be central to our program, leadership at any given moment will be a function of competence in whatever area is under consideration, not a reflection of age, titles or hierarchical structures. We will encourage our faculty and students to relate to each other on a first-name basis as an indication of this colleagueship, while respecting the fact that cultural traditions can make such familiarity a source of discomfort. We will seek to help everyone come to understand that titles and formality can contribute to creating boundaries that may interfere with important elements of learning. For example: removing boundaries can be important in ensuring patient safely; being willing to raise questions about, even offering challenges to, a teacher's ideas and assertions. We will endeavour to tread gently while inviting reflection about the possible unintended consequences of cultural traditions and habits that may be counterproductive to maturation as a learner and as a professional.

c. Students are helped to be and remain "mature" learners

High quality, safe patient care depends upon doctors who are effective, lifelong learners who are willing and able to make changes when appropriate. The medical, behavioural and social sciences, which are the foundation of health professionals'

daily decision making, are evolving rapidly. Staying current, and revising one's patient care practices when needed for remaining safe and helpful, are continuing challenges. A fundamental requirement for all medical graduates, we feel, is being highly effective learners, and remaining so throughout one's career. We want our students and graduates to be:

- Continuously curious and reflective;
- Regularly re-examining and redefining their own goals and standards, challenging themselves toward higher and higher, attainable aspirations;
- Genuinely comfortable with ambiguity and change;
- Open to reconsidering and modifying earlier convictions and practices when there are reasons to do so;
- Focused on being accurately self-aware and self-assessing in all their areas of professional activity;
- Sufficiently informed about their own learning habits and approaches to make adjustments when needed (and to be able to help others develop as learners).

We will strive to select faculty and students who are effective learners at the time they join us. Yet, we recognize that many people succeed in accumulating credentials, passing conventional exams, even excelling in some institutions, while being less fully developed than they could be as lifelong learners. In the adaptive education environment of our program we will provide whatever help is requested or needed by new faculty and students for becoming genuinely "mature" learners. We also want them to be, or to become, sufficiently self-aware of their own learning processes to be able to help coach others toward becoming mature learners.

d. Clearly defined mission, with consistent goals and "culture"

We seek to create and sustain a core "culture", with consistent goals and values. The most important and longest-lasting outcomes of the intense, prolonged experience of attending medical school are not the individual pieces of knowledge or specific skills that are accumulated. Some of that knowledge and some of those skills will be out of date fairly soon, and few, if any, will be relevant in the careers of every graduate (given their likely wide variety of work settings). The most important, lasting outcomes of a medical education program are the overriding values, attitudes, cognitive and emotional habits, and priorities that the students assimilate and sustain. These are the factors that will guide their professional standards, learning, and overall conduct. When the values and goals of a program are inconsistently represented during the students' learning experiences, even represented in contradictory ways, as they are in some educational programs, the outcomes among the students tend to be unpredictable and sometimes are undesirable (as has been confirmed in the literature on the "hidden curriculum").

We regard a central responsibility of a medical education program to be assuring that a core set of values, processes, and priorities is defined, clearly articulated, and consistently represented and reinforced by those who serve as mentors, facilitators,

supervisors and advisors. The task of defining, refining, and continuously revisiting these central cultural characteristics is, itself, one of our institutional premises. We want all of our students and faculty to come to consider themselves as both co-creators and guardians of the evolving iMEdTrust culture. We will do what we can to ensure that this mind-set permeates our selection, learning, and assessment activities throughout our educational program.

Our core values define iMEdTrust and our Partner Medical Schools, and will be made clear to potential students and faculty so that they can determine if this is the sort of organization with which they want to be associated. Our founding values include:

- Respect for all people, regardless of their origins, their personal beliefs (within legal and ethical limits), or their other characteristics;
- Outreach to and collaboration with the medically underserved, locally and internationally;
- A non-hierarchical, values and competence-based, egalitarian organization, free of authoritarian controls;
- A dedication to providing the highest standards of educational experiences, based as much as possible on available evidence about human learning and development;
- A conviction that the iMEdTrust medical education program should include:
    - Learning approaches that are based on curiosity and adaptability (not on tradition, certainty or dogma);
    - Continuous study of and refinement of the educational process;
    - Reflective, active, collaborative learning (not rote or competitive learning);
    - An educational atmosphere that is empowering to all involved and, to the extent possible, joyous and fulfilling for all;
    - The capacity to help students become graduates who have the characteristics identified in our iMEdTrust Vision of the optimal 21st Century Doctor.

e. Non-productive stress is minimized

Our learning processes and expectations are designed to minimize non-productive stress and maximize performance. Thanks to the findings from relatively recent research, we understand far more about the conditions that support lasting learning than were understood by those who established our dominant educational traditions and practices. We now realize that some of those traditions were sub-optimal, even counter-productive. In conventional programs, for example, high volumes of memorization are expected, typically without sufficient contexts or rationales that are meaningful to early-stage learners. (Needing to pass an exam is not a meaningful rationale.) We now understand that the human brain is seriously limited in its capacity for remembering information that isn't meaningful or put to regular use. The part of

learning that involves remembering and reproducing information is best served when the material to be learned meets several conditions, including at least one, and preferably more, of the following:

- The learners feel emotional (preferably, positive) connections to what they are learning;
- The material has links to the learners' existing understandings and perspectives (the learners find the new material meaningful);
- The learners put the newly learned material to repeated (preferably, practical) use soon.

Those educational traditions in medicine that have required large amounts of memorization (and other expectations, such as having students sit passively and be presented to for long stretches at a time, and much more) have contributed to considerable, non-constructive stress for many medical students. This isn't necessary. Partly, memorization is no longer needed during this era in which powerful, mobile memory-support devices are widely available. Partly, we now know that having learners' career progress depend upon feats of memorization that are beyond our regular human capacity can be potentially misleading and harmful in several ways:

- Students who make the considerable effort needed to meet the memory requirements of conventional tests may deceive themselves and their faculty into concluding that they have learned the material and that they are more accomplished than they actually are. (Demonstrating short-lasting memorization capacities — often from recent cramming — is not a reliable foundation for real-world professional performance.)
- Those who have difficulty with the memory requirements of conventional exams — who are more oriented to being problem solvers and to engaging in systematic reasoning, which are capabilities required for professional performance — may incorrectly and unfortunately conclude that they are unsuited for the demands of being a clinician.
- Trusting one's memory can be potentially dangerous to patients.

Too many medical graduates regard "learning", as they experienced it while being students, as sufficiently unpleasant that they avoid further, systematic learning experiences during their careers.

In addition, we now recognize that too few programs give sufficient attention to the fact that stress in education falls along a continuum, from insufficient to optimal to excessive. This continuum describes the subjective experiences of individuals. That is, stress works differently for different people, depending on the ways in which their personal characteristics intersect with the conditions and expectations they face. An optimal stress level ("eustress") is that level which is motivating and energizing. Each person has his or her own context-specific eustress level. For some, a very low level

of stress is all they can handle, and additional stress is counter-product, even harmful.

The need to match expectations (stress, pressure) to the characteristics and readiness of each student is one of the larger justifications for the "Adaptive Medical Education" (individualized Learning Pathways) that we are developing as our primary educational approach and that we will offer in each of our Partner Medical Schools. (See Section H of this Appendix.)

In the absence of a program that is sensitive to these issues, many students see their difficulties dealing with educational expectations that they find unreasonable (e.g., memorization requirements that are beyond normal human capacity) as a sign of their own limitations, not a fault of the program, which can lead to discouragement, depression, and worse.

At iMEdTrust we will strive to know every learner well enough, and help ensure that the learners know themselves well enough, so that, together, we can adjust our expectations and their experiences appropriately. That is, we will seek to maintain the challenges to which they each are exposed as close to their individual eustress levels as possible. We will also help them become increasingly more resilient, so that they will have a growing range of experiences and pressures that fall within their acceptable, even welcome, eustress range. (Pressing them beyond that range before they are ready, as indicated, can be counter-productive.)

NOTE: If these notions are new to you, we hope you aren't concluding that this sounds like we will be indulging or pampering our students. Our approaches are the reverse of such non-productive, misguided strategies. Pampering seeks to reduce or avoid subjective experiences of stress. We seek to help our learners understand what works for them as eustress; that is, what constructively pushes them to do their best, to reach toward the limits of what they are capable of becoming, without going over the line that results in a level of stress that contributes to diminished aspirations and performance. Our focus on helping students become increasingly more resilient is, essentially, the opposite of pampering.

f. Learners are consistently "active"

Students will be continuously engaged as active learners. In medical education there is growing recognition that learners need to be "active", (that is, engaged, reflecting, participating, thinking and acting, taking responsibility), if they are to derive meaningful, lasting learning from their experiences. At medical education conferences and in research journals there are many acknowledgements of the inappropriateness of keeping students as passive listeners and observers at presentations or at demonstrations offered by others. Yet, published reports indicate that large proportions of medical education offerings still render the students passive, and large numbers of medical faculty members remain reluctant to relinquish their familiar pattern of presenting traditional lectures and other faculty-centric offerings. Even some small group experiences, (e.g., some problem-based learning and its variants), are offered in which educators dominate, rather than facilitate, the process.

In addition, “explanations” (justifications/rationalizations) are still offered, asserting, for example, that large group gatherings are appropriate because they are “efficient”. Large group sessions may seem efficient because they keep demands on faculty time to a minimum. Regrettably, they also keep student learning to a minimum. That is, these are not arrangements for efficient or lasting learning. Many large group gatherings accomplish little more than conveying to the students what they should study in preparation for the exams that their teachers expect them to take. That form of exam-focused study does little toward achieving long-term learning or toward establishing effective lifelong learning patterns.

Beyond the limitations of the traditional, uninterrupted lecture format, students are also kept passive whenever they are expected to follow orders, to do what others tell them to do. Medical education, generally, is still only slowly transitioning from its long pattern of regarding the educational process as needing to be a form of control. Too many medical students are still told where to be, at what time, for how long, and what they are to do while they are there. Student attendance is often recorded to confirm that the students have complied with these expectations. And, these assignments tend to be planned for the students before the faculty even know anything about the specific students for whom these directives were developed. In other words, students are treated as if they are all sufficiently similar so that they can benefit equally from these standardized, required offerings.

Yet, the evidence about learner diversity is strong and growing. Rather than being nearly identical, learners are unique in a variety of educationally important ways. They have unique sets of prior experiences as well as individual perceptions, interests, capacities, and approaches to learning. At iMEdTrust we are designing our entire curriculum to be based on arrangements for active learning. We will encourage the overt participation of learners in as many decisions as possible related to their learning. We want them to pursue their interests, motivations and career plans (within the constraints of being appropriate for achieving the needed and agreed outcomes). The focus of their activities will be shaped by their current readiness for working on aspects of the particular, expected Learning Outcomes. Students will be encouraged to select the most appropriate Learning Experiences from among those we have available at each stage along their Learning Pathways (and we’ll help guide the students, as necessary).

All of education, including medical education, much like pharmaceutical agents, may produce both intended effects and unintended side effects. Educational programs can bring unplanned, negative consequences. For example, when learners are expected to be compliant, to follow the directives of those who have influence over them and their careers, they are at risk of developing patterns that are not in the best interests of their development as professionals. Medical students who are treated as not being ready for responsible decision-making can experience delayed or incomplete development of their capacities as independent learners and decision-makers. Such outcomes are not desirable for the people or the communities these

future doctors are meant to serve. We expect that iMEdTrust-related students, who we will treat as being on the road toward becoming mature professionals from the outset, will move quickly toward the goal of becoming effective, thoughtful, trustworthy learners and careful, thoughtful decision-makers.

g. Main approach is Adaptive Medical Education

Learning experiences at iMEdTrust are individualized and flexibly adaptable to the maximum extent possible. As indicated, there is strong evidence that each learner is unique in ways that are important for learning. The inescapable implication is that Learning Experiences should be as close to optimized for each learner's individual needs as feasible. Requiring learners to spend significant amounts of time working on material they've already mastered, or on material that they aren't close to being ready for (among some of the many mismatches that occur regularly in standardized education) is unreasonable and wasteful. Most of us expect nothing less than adaptive educational opportunities when we engage in learning we do outside of medicine. Think of your preferred approach to learning a musical instrument, or a new computer application, or a sport such as tennis or skiing. For learning those capabilities and others, would you rather learn in a large group with a pre-set, standardized plan or with a personal coach who gets to know you and your particular level of readiness, and provides individualized, customized learning experiences and uniquely adjusted guidance?

Our Adaptive Medical Education approach involves seeking to achieve optimal, lasting learning, while being resource efficient and timely. This will be accomplished, in part, by continuously monitoring the intersection between what each learner is ready for and what each of them need (in relation to the expected and desired outcomes). The learners' needs derive from a blend of several sources. These sources, in turn, will be continuously monitored for information that is relevant to our overall educational program and to the unique circumstances of each student. The sources of the requirements (outcomes that are expected and required) are:

- The Learning Outcomes expected by our UK regulators;
- The Learning Outcomes (if any) expected by the regulators in the countries to which our graduates will return, or of the Partner Medical Schools that the students are attending;
- The specific Learning Outcomes we expect for all of our graduates, which are in addition to those expected by regulators (as explained in Appendix B, Section 8);
- Additional Learning Outcomes individual students may want for themselves, which we consider to be consistent with iMEdTrust's mission and we can support within our available resources.

As clinicians we understand the principle of individualization and adaptation, which we routinely demonstrate when providing health care. We readily adhere to our long-standing clinical tradition of being respectful of the uniqueness of each patient, caring

for people one at a time. Many clinicians are now seeking to provide even more individualized care, giving growing attention to versions of “personalized medicine”.

Yet, as educators, our traditional practices tend to overlook the separate needs of individual learners. Some medical educators are now recognizing the desirability of adapting learning experiences to the unique characteristics of each learner, and some projects have begun appearing with that goal. We will pursue an individualized approach to the fullest extent feasible. For us, Adaptive Medical Education will be an institution-wide routine.

A dominant feature of the standardized approaches that remain common in medical education involves the assumption that the passage of time is a reasonable basis for arranging learning experiences. Neither research findings nor systematic arguments support that legacy approach. Pre-scheduling the duration of learning experiences equally for all students in a cohort may have the “benefit” of making planning work easier for administrators. But assuming that some fixed amount of time will be equally appropriate for all cohorts of learners who participate in a standardized set of experiences, year after year, is educationally indefensible.

As has been observed by others, we can’t have both fixed time and desired outcomes for everyone. We can either have fixed times, accepting that there will be variable outcomes among the students, or we can ensure that all students achieve, as a minimum, the program’s required and desired outcomes, which are enabled, in part, by allowing variable times to completion. An important element of our Adaptive Medical Education will be our arrangement for students to progress through the program and graduate when they are demonstrably ready, not when the calendar tells us that a previously selected date has arrived.

Reasonable limits will need to be imposed on this flexibility. Those limits will be individually determined, based on an analysis of multiple variables that are relevant to the individual circumstances of any student who may want to, or need to, fall outside of our usual range of acceptable time limits. Our preliminary estimate is that the average time to completion of our full program will be approximately four years. We doubt there will be circumstances that justify students taking as much as six years. Some will likely be demonstrably ready within three years or less. We need to wait to see what the minimum duration required by regulation will be then.

Understandably, there is a common concern that there will be high, even excessive costs associated with offering such an individualized program. Although that concern may once have had some validity, the situation is now substantially changed. By making effective use of digital and other technologies, we can provide a high degree of individualization cost-effectively. Indeed, we expect to demonstrate that we can provide an enhanced quality of medical education at a cost that is lower than is typically accepted. At iMEdTrust we will be taking full advantage of the potential of technology, as we explain in Section J, below.

h. Learning events are based on small groups and individual experiences

Adaptive Medical Education requires small group and individual learning arrangements.

Group learning.

Adapting to a learner's uniqueness is most readily achieved in solitary learning situations, in which a student works alone with well-designed digital resources or one-to-one with a well-prepared coach or mentor. Yet, some capabilities needed by future doctors require learning in groups. The group itself is part of the learning experience. A central requirement of contemporary health care is clinicians who are highly competent collaborators, who have the attitudes and skills necessary for being effective contributors to well-functioning teams.

As soon as two or more learners are working together, solving problems, doing tasks, making plans, there are trade-offs. If there are too few learners, there may be insufficient or excessive diversity of perspectives, communication styles, or capabilities to provide the balanced, optimal benefits of participating in a group. If there are too many in a group, the opportunities for individual participation can be diminished to the point of ineffectiveness.

Given that there are random, uncontrollable factors that can influence the mix of characteristics among those who become members of small groups, it isn't possible to have a rule as to which group size is always best for learning. Still, many of us have come to consider eight to be a reasonable, average, desirable size for group learning, which is the size we've selected for most of our Collaborative Learning Groups (CLGs).

We've chosen to use the CLG name to emphasize a significant purpose of having learning groups. To get a glimpse of how such groups will function, please see the illustration we've provided in Story #2 in Schedule 4. As suggested in that story, our CLGs require highly prepared facilitators for the process of helping all group members become fully committed to and skilled at this way of communicating and learning. Once that goal has been fulfilled, the groups will intermittently and increasingly function without a faculty member, giving them practice being their own facilitators. We want our students to gain experience and effectiveness as contributors to shared-leadership peer groups. We want to help ensure that they are prepared for one of the important ways of continuing to function and learn throughout their careers.

Side note: Since self-awareness (including emotional and social intelligence), together with communication and collaboration skills, are central goals of iMEdTrust's educational programs, we will create a culture in which everyone is helped to become comfortable with, even eager for, opportunities to review their daily functioning. All learning events will be video-recorded. We will use a system that is highly protective of privacy yet easy for participants in events to efficiently access parts of, or entire events in which they've participated. These recordings will be used regularly for individual review, self-critique and shared group reflections. Our

educators will be especially prepared to manage these processes with skill and sensitivity.

For other learning goals we will have other kinds of small groups, in various settings. For simulation tasks we anticipate having at least two main kinds of groups: One kind will be comprised of only medical students, with all participants focused on developing and refining various sets of skills, some of which require a team and some of which are individual. During individual learning the student's group members will share a responsibility for helping coach each other. An additional kind of simulation-related group will focus on learning key inter-professional health team skills and attitudes. For those groups, we will have fairly frequent inter-professional learning experiences in collaboration with nursing and other healthcare students from the University of Kingston, with which we have a signed Memorandum of Agreement.

Our students will also gain experiences and have learning opportunities as members of two other kinds of teams, both of which will be in "real" activities: 1) in clinical teams, during their extended experiences in various primary care centres, and 2) in research teams, during their extended learning experiences in one or more research settings.

Individual learning.

Our students will engage in two main categories of individual learning: 1) on their own, using digital and other resources, and 2) working with a mentor. Our Adaptive Education Management System (AEMS) will be the main resource we provide for our students. They will use it daily, likely for several hours on many days. This system will be one of our major inventions, which we will develop, research, and continuously refine. It will be the foundation of a large part of our Adaptive Medical Education program and of our contribution to our Partner Medical Schools and other organizations as part of our charitable mission. Our AEMS provides resources needed for:

Supporting direct student learning of information and understandings relevant to tasks and challenges they are facing in other learning settings, such as in simulated or real patient care or in their Collaborative Learning Groups (CLGs), as well as for pursuing their personal areas of interest;

- Practicing tasks and engaging in online simulations that are recommended by the system at appropriate times, based on their relevance to that individual student's current areas on interest, work and personal readiness;
- Enabling students to record, keep and review their personal, ongoing Learning Logs, in which they practice the self-awareness and self-assessment skills that are foundations of lifelong learning and are part of the capacity for constructive adaptation and change.
- Assembling continuous formative assessment information, enabling learners and their advisors, at any time, to have a good sense of how the students are doing in developing their required and desired competencies in relation to their expected outcomes and for guiding the selection of their next learning tasks;

- Orchestrating the learners' and educators' schedules and tasks, and allocating relevant resources and spaces for each person's use when needed;
- Continuously gathering rich information (made anonymous) for the investigations being conducted by our Health Professions Education Research Institute and their collaborators.

These functions are elaborated upon somewhat, next, in Section k.

i. Optimized uses of technologies

We will continuously research and make the best possible uses of the potential of simulations, and other learning-relevant technologies. With some notable exceptions, most medical schools have not yet been taking nearly full advantage of the large potential of the many advances that have been made in simulation, memory-support and learning-support technologies. We intend to learn from the best of what is being done by those who are exploring new directions in this domain. We will also take full advantage of work being done outside of the health fields, and we will explore, test, and use the potential of resources that are under development and on the horizon. We expect to make contributions by developing new approaches and designs as well. We already have, and we are expanding our relationships with, corporate leaders in these fields (see Schedule 9, Partners).

Educationally-relevant technologies are only as valuable as the ways they are used by faculty members and students in an educational program. These resources are not self-sufficient and they are not mere add-ons. The potentials and limits of technological resources need to be well understood, and the educators who use them need to be highly prepared. Taking full advantage of these technologies also requires an appropriate curriculum and an educational environment that is designed to derive advantages from their potential. The effective use of these technologies, and considerable practice in using them, will be part of the focus of our Educator Development Plan (EDP).

Some accommodations may need to be made. Special considerations can be needed when using technology. For example, we will ensure that our educators are equipped to help maximize the learners' sense of trust, and to deal sensitively with any students' residual hurts from suboptimal prior experiences with technology. As others and we have found, some students need help overcoming their resistance to being recorded, often as a result of having felt humiliated by poorly prepared prior teachers or classmates, when reviewing their video-recorded experiences. Our preparation of our students and faculty will give close attention to these and related matters.

Simulation

There are important, multi-level sets of potential benefits to having a substantial, carefully designed simulation program. Appropriately used simulations offer opportunities for focused attention on sub-parts of complex skills, for repetitive practice, for avoiding risks to patients and learners, and much more. Simulations can reduce the need for time spent in real patient-care settings. Since the duration of

patients' stays in hospitals are becoming steadily shorter, patients are less available for medical student learning. Given these conditions, simulation-based learning, if properly done, can be even more effective than hospitals for parts of student education. The following are among the main advantages of simulated experiences:

- Many skills needed in healthcare are too complex and overwhelming for beginners. With simulation, learners can master sub-parts of total skill-sets individually, gradually fitting more and more of these parts together. When properly used in this way, simulation can enable faster and more effective learning than is possible in real settings.
- Simulation can be an important part of Adaptive Medical Education. The degree of simplicity or complexity of tasks can be adjusted to match each learner's level of readiness.
- Simulation enables preparation for settings and situations that aren't currently available, but for which preparation is wanted, as the learners may face them in the future (e.g., diseases present only in other parts of the world; patients of an age or with characteristics that aren't locally available; severe trauma events, which aren't routinely available for learning; and much more).
- Procedures that can be potentially hurtful to patients (ranging from drawing blood to doing various office procedures, to delivering babies) can be learned up to the level of reasonable mastery without causing discomfort to other people or putting them at risk.
- Learning to relate to other human beings in professional, empathic, sensitive ways, and communicating clearly, are among the most important and the most complex requirements of being a doctor (and not enough doctors ever get to their full potential in these areas). Simulated (standardized) patients (suitably prepared amateur or professional actors) can present opportunities for repeated practice in dealing with the full range of relationship tasks, from the most elementary to the most challenging, all in an environment that is safe for both the learners and the subjects of their exchanges.

Learning effectiveness and efficiency can be optimized by carefully interweaving simulation-based and real-patient-based experiences (when available). Although simulations can accelerate learning, the full integration of complex capabilities requires the perspective that comes from real experiences.

Our well-prepared faculty will have the judgment needed to guide the students back and forth between the simulated settings and authentic patient care settings, as needed.

Memory-support, planning and communication

Most, possibly all, arriving medical students are now part of the "digital native" generation. That is, unlike many faculty members, who have been aptly characterized as being "digital immigrants", students tend to feel comfortable with a variety of digital technologies and their uses. They expect to use, and we will provide,

portable devices that will be a centre of their daily activities. They will use their devices (possibly iPads, as of this writing) for many tasks: daily research; note-taking; scheduling; coordinating with the school's allocation of resources; communicating with mentors, facilitators, colleagues, and members of their social networks; reviewing their progress in relation to their expected outcomes; engaging in Online Learning Tasks and simulations that are part of their current Learning Pathways and Learning Experiences; and more. They will properly conclude that carefully chosen online resources are far more dependable than their own memories for anything that is important and which they are not using regularly. If they aren't already, they will become experts at doing rapid, discriminating online research, and at creating and referring to their own records when they need information. Our students won't be expected to demonstrate their recall of memorized information. In fact, as part of helping prepare our students to be safe clinicians, they will be expected to show that they don't fully trust their own memories for critical information and decisions.

Orchestration

Our Adaptive Medical Education program will utilize digital resources to their fullest, and we will have high-level specialists continuously at work researching and inventing fresh ways to help learners do a variety of tasks, such as: assessing and keeping track of their progress (toward their expected outcomes); gaining access to learning resources that are appropriate for their current circumstances and needs; helping them know what physical resources are currently available (such as simulation technologies they want to use for extra practice, or space for a meeting with some group-mates); reviewing and managing their weekly, daily, and hourly schedules; communicating with group-mates, mentors, and other educators; and more.

2. iMEdTrust's Curriculum; Part 2: Educational Content

a. Dominant focus on Primary Care.

We seek to help offset the global problem of a specialty imbalance.

Among the strongest of our lingering traditions in medical education, globally, is the assumption that much or most of the learning of clinical medicine should take place in hospitals, often in tertiary-care-oriented university hospitals. In those settings, appropriately, the main focus is on managing complex and end-stage health problems. In these hospitals, student attention is seldom expected to focus on the social or other determinants of illness (what are sometimes called the "upstream" contributors to ill-health). Also, typically, in hospital settings, limited if any attention is given to lifestyle management or other aspects of achieving or sustaining wellbeing. In other words, in hospitals intervention is the dominant concern and the preoccupation tends to be on solving health problems, not on avoiding them. Having the preparation of doctors occur mainly or exclusively in hospitals is hardly a system

that would be designed if we were starting over and planning an arrangement for preparing the kinds of doctors that the world most needs.

Almost everywhere, there is a specialty imbalance in medicine, with an insufficient proportion of, or even an absence of, badly needed, well-prepared primary care doctors (GPs). There are many likely reasons why fewer than needed medical graduates choose careers as GPs. High on that list is the consequence of two factors: a) the disparaging messages about general practice that many students receive from some of the sub-specialty doctors who are prominent role models during the students' hospital-based clinical education, and b) the insufficient preparation that students get for becoming comfortable managing the kinds of complexity and ambiguities associated with caring for unfiltered (not-pre-selected) patients who are cared for by GPs.

Many contemporary patient problems, at all levels of healthcare, derive from the consequences of social, economic, and life-pattern issues. These and the multi body-system, chronic illnesses that many patients deal with, require special mindsets and attitudes, which don't emerge spontaneously, especially when one's experiences have been primarily with hospitalized patients. Future doctors need extended experiences, highly prepared supervisors, and opportunities to understand the unique rewards that can be associated with helping people make positive shifts in the trajectory of their lives. Future doctors also need to develop a deep understanding of the inseparable role of effective community health systems, with which they must closely coordinate their care of patients. Rarely can or does any of this happen in the hospital environment, and it is unlikely to happen in short, infrequent exposures to primary care patients, especially with insufficiently prepared supervisors, no matter how well meaning they may be.

A key part of preparing to value a career as a generalist are opportunities to experience and understand the importance of continuity of care. The highest quality care, which involves having a lasting impact on the ways that people conduct their lives, depends on a deep understanding of people and their circumstances. Such understandings are most likely to evolve with multiple encounters over extended periods of time. The episodic, mostly single-event encounters that characterize most hospital experiences, and even the experiences many students have in conventional ambulatory settings, deny them the opportunities they need for learning to form meaningful (non-superficial) relationships with patients (and their families).

In the iMEdTrust programs we will arrange for students to have their own cohort of patients who they follow over time. Also, many of their experiences will be in under-resourced settings, helping them prepare for the circumstances in which we expect most of our graduates will practice. Those settings are dominantly in need of well-prepared generalists. The circumstances in the settings in which most of our students will likely work may also require that they develop some secondary-care-type procedural skills (e.g., in obstetrics, minor orthopaedics, wound repair). We will help

them develop those additional skills, as needed, as part of our individualized, adaptive approach to their education.

b. Emphasise wellness promotion

Life habit management and health maintenance are growing global needs.

A secondary, largely unintended consequence of the hospital settings of much of conventional medical education has been a perpetuation of the assumption that providing interventional care is the dominant responsibility of medical professionals. A companion consequence of this assumption has been a relative neglect of the importance of illness prevention and health maintenance. Others and we are persuaded that increased attention must be given to shifting our educational emphasis from intervention to prevention. This is both an ethical obligation and an economic imperative. Of course, well-done intervention will always remain important and needed, but over time the relative amount of intervention needed can be reduced if significantly increased attention is given to preventive care and to reducing the social determinants of illness (e.g. poverty, stress, abuse, inadequate education). Our overall initiative is devoted to helping communities have a more appropriate balance between prevention and intervention, while also helping reduce the social determinants of (the "upstream" contributors to) ill health.

We must acknowledge that there is a counter-cultural element to emphasizing prevention. The essence of prevention is, in part, achieving and maintaining wellbeing. It is also, in part, helping ensure that undesirable events don't happen. In much of the world, successfully helping events not happen is counter-cultural in two ways: i) it requires a long-term perspective and ii) it reduces opportunities for "saving" people. Helping ensure that problems don't develop is contrary to prominent cultural forces that tend to celebrate quick solutions and dramatic rescues.

We will do our best to help reduce the sense of glamour and appeal that are attached to the notion that medicine is dominantly an interventional, "heroic" profession. We will work to attach appeal to long-term thinking: to having our graduates appreciate the values to their patients, to themselves, and to society of having continuity in their relationships and in providing care over extended periods of time. We will emphasize the individual, family and community rewards associated with achieving and sustaining a genuine sense of wellbeing.

Among many other steps, this requires a shift back to the roots of the concept of doctor as educator.[1] And, like so many aspects of 21st century health care, effective education and prevention require a team, not solo practitioners. Anticipatory health care takes the collaboration of well-prepared doctors, nurses, social workers, patient educators, nutritionists, social systems, family members and other influencers, community representatives, and more. This will be a focus of our collaborative small-

[1] The MD degree is derived from the Latin designation, *Medicinae Doctor*, which means "Teacher of Medicine".

group discussions, our team-based simulations, and our team-oriented model in clinic practices in which our students have extended learning experiences.

c. Clinical & fundamental science learning are integrated throughout

Basic biological and clinical sciences will be regarded as inseparable, not as sets of disciplines to be learned relatively independently of each other.

Too many medical doctors have emerged from their "basic science years" (traditionally, and still commonly, the initial years of medical school, focusing mainly on the biological sciences), saying, "I'm glad I'm done with that!" A growing number of medical educators (both basic scientists and clinicians) are recognizing that isolating the basic sciences (also called the "fundamental sciences") from the clinical contexts to which they need to be applied was a serious mistake. Increasing numbers of programs are finding ways to integrate these two large domains, but the process is far from complete in many settings, and hardly begun in others.

At iMEdTrust-related schools, as is becoming true in some other medical schools, we consider the clinical context to be the proper springboard for helping students recognize the importance of, and for being motivated to learn, the basic sciences. Our program will begin with safe introductions to the world of clinical care, for those who need it. (In our Adaptive Medical Education model, those of our students who transfer from another clinical field won't need to participate in most of these introductory experiences.) The introductions will be done in our small group discussions, in our simulation centre, and in our patient-care clinics. Basic science understandings will be built on the foundation of the students' curiosity and their desire to be fully helpful to patients. Underlying our plan is the notion that common and important clinical situations, not the long-ago division of the basic sciences into separate departments, should be the basis for building a growing mastery of relevant aspects of the sciences fundamental to clinical practice. This principle is basic to much of our overall approach to curriculum design.

In this area, as in other parts of our program, an ever-present guiding force will be the learning outcomes expected by our primary and other regulators. These outcomes, in well-organized, accessible form, will be continuously available to our students and to their mentors and other educators as part of our Adaptive Medical Education System (AMES). We expect them to be referring to the AMES regularly, while engaging in their daily activities. The outcomes will be somewhat individually customized for each student, to include their own, approved, additional outcomes, beyond those expected by the regulators and by our program. These outcomes will also form the basis of the continuous formative assessments that will be part of every student's daily life. We anticipate that our students will be surprised to hear that many medical students in other programs commonly express the lament: "I wish I knew where I stand."

In addition, a key element of our perspective on the rationale for learning the sciences is the importance of coming to understand, value, and take on a life of practicing the processes of science itself. The overriding goal is somewhat

irrespective of the content of any one science category or of any group of science disciplines. We want our students to routinely think like scientists: to be continuously, constructively sceptical of all “conclusions”, to have a deep sense of the complexity of high quality investigations of human biology, social systems, healthcare interventions and more. We want them to grow beyond any inclinations they may have had to jump to premature, unwarranted conclusions in any situation, and to get beyond any fixed mind-sets or prejudices they may have had about other people. We see a close link between being authentically scientifically-minded and being open-minded about people, irrespective of their biological, national, cultural, or other characteristics. We want them to treat all patients, colleagues and others with equal respect.

d. Behavioural and Social Sciences are integrated into all learning experiences

The implications of the behavioural and social sciences for patient care are profound. They will be fully integrated with all clinical learning experiences.

Conventionally, the behavioural and social sciences have been even more isolated from mainstream clinical education than were the “basic sciences”. Even now, the pattern remains in some medical schools, where behavioural and social issues, if included at all, are given separate focus, in their own courses, and are not integrated into daily thinking and practice. When elements of a medical curriculum are relegated to separate courses and not integrated into the daily care of patients there is a risk that learners will derive the message that those segregated topics are just diversions, not central parts of the process of effective healthcare.

As with the biological sciences, our approach to the social and behavioural sciences is based on the notion that these disciplines are not best served in a medical school curriculum by being offered in isolation, in separate courses. Their importance derives from their central relevance to understanding people, families, and communities, in relation to the process of providing optimal health care.

Many of the behavioural and social scientists on our faculty will be clinicians themselves, and they will have a deep, practical understanding of the health care process. They will serve as co-facilitators of many of our small-group discussions, many of our simulation exercise debriefings, and they will be a presence in our healthcare clinics. In addition, our GPs and other health professionals will have backgrounds in, and appreciations for these sciences. Our clinicians will be able to apply the lessons from these sciences to clinical care.

Given our commitment to focusing on illness prevention and health maintenance, we will have a deep concern for helping our students understand human motivation and the complex processes involved in helping others achieve lasting behaviour change (which will also be important in our Educator Development Program (EDP).

e. Relationship and communication skills are integrated throughout

We consider the skills needed for effective communication and for establishing trust-based relationships to be fundamental. They, too, will be integrated with clinical learning throughout the program.

Among the common dissatisfactions reported by patients is the incomplete and unfeeling nature of their exchanges with some doctors. We regard direct patient care as a process that depends, in part, on the quality of the relationships between patients and their healthcare professionals. Those relationships have multiple levels and components, with communication being a foundational element. As with the biological, behavioural, and social sciences, these relationship skills are not optimally developed by being relegated to isolated courses. These important components of the patient-doctor encounter should be integrated into, and reinforced during, all encounters in which students participate. The implications are substantial. All clinical educators (whether in the simulation centre, in the patient clinics, in hospitals, or elsewhere) should be well prepared to observe, assess, and clarify these processes, and to be appropriate role models of their expression in practice. This will be yet another area of emphasis in our EDP.

Achieving these goals is among the main reasons for the widespread deployment of video-recording resources throughout our learning environment. We will extend a considerable effort to ensure that all faculty members and students are comfortable with and able to take advantage of the large potential value of video review and analysis. We will encourage close attention to communication elements in all situations, whether the students are relating to group-mates in discussions, communicating with simulated (standardized) patients, working in a team learning procedures with a manneguin, caring for patients in one of our GP clinics, serving as part of a team in a research lab, or writing messages to others over the internet.

As indicated in other parts of this document, our intention is for all of the graduates of all of our Partner Medical Schools to have high levels of skill as communicators and have the many understandings associated with being capable of earning and sustaining the trust of others. Developing such capabilities takes considerable practice over extended periods of time, accompanied by reflection, self-assessment, and constructive feedback from others. When used effectively, the systematic review of video recordings of student experiences, in our view, is unique in its power for supporting and helping accelerate such learning, as we will seek to assure happens consistently. Achieving such goals is another reason why we consider our Educator Development Program (EDP) so important.

f. Inter-professional and collaborative (team) skills are emphasised

Inter-professional, collaborative, teamwork skills are basic to current and future clinical practice and will receive high attention throughout our learning experiences.

As many healthcare leaders and writers have asserted, the proper rendering of health care now needs to be based on effectively functioning teams. Many factors are causing the process of effective health care to require more than a single person

can usually provide. Among those factors are economic pressures, the complexity of many patients' circumstances and conditions, and the importance of being respectful of patients' widely varying social, cultural, and religious backgrounds, which can influence health, illness, and recovery. Increasingly, we need professionals with well-refined communication and team skills, and an environment of mutual respect, as well as a readiness for shared leadership and collaboration. Our Collaborative Learning Groups, many of our simulation centre exercises, and the process of care rendered in our clinics are all designed to support these current and future needs.

The aviation industry has successfully enhanced the safety of flying by focusing careful attention on team skills in the cockpit. We are joining the growing number of medical schools that are bringing similar attention to the patient-care environment.

NOTE: As you may have detected, we propose the integration of many perspectives and skills throughout our students' Learning Experiences. We are persuaded that there are risks to the traditional approach of sequestering topics, themes, and values into individual courses. The meta-message of the conventional approach is that most educators and clinicians don't need to worry about topics that aren't included in their learning of some specialties. Given others' and our convictions that these perspectives and capabilities are centrally important for all clinical practice, especially primary care, we argue that they should be part of all clinical learning experiences, and we are designing our curriculum accordingly. For a brief explanation of how we plan to attend to so many goals throughout our curriculum, please see Part 3 of this Curriculum document.

g. Emphasis on serving the under-served

A commitment to serving the underserved is a central, expected outcome of our mission and our program. Many of our students' clinical learning experiences, locally and internationally, will be with people in underserved settings.

The settings in which students learn don't, alone, assure that they will develop and strengthen the values and priorities we want them to have throughout their careers. Having, or showing a potential for developing, these values will be one of the areas of focus during our student selection process. In addition, these values need to be held and consistently practiced by the faculty members who serve as the role models to whom our students are exposed while learning. In these and other ways we will reinforce the core values of our philanthropic initiative.

Our first cohorts of students will have many of their clinical experiences in and around our initial, London-based campus (iNSoMed). A good proportion of those Learning Experiences will be in "stressed" communities of this city. Most of our students will be drawn from medically underserved areas, especially those countries with which we are developing plans for partnerships in helping expand their medical education capacity. A unique characteristic of London is that there are significant numbers of people who were born in every low-resource country with which we anticipate connecting as part of our iMEdTrust Network. We expect our London-based students to have opportunities to work with people from their home country

and culture. In addition, our London-based students will rotate out of London for clinical experiences in their home countries and elsewhere, with a focus on coming to understand the circumstances and demands, as well as the rewards of contributing to underserved populations. After our Partner Medical Schools in the other countries are developed, students will have most of their clinical learning in and near their home settings. We anticipate that our graduates, with few exceptions, will bring the priorities and values of serving the underserved to their life's work.

Those students from low resourced countries who have their main education in London will have visas that require them to return to their home countries after completing their preparation. We also expect a large majority of our students to be supported by tuition waivers or bursaries provided by their government, by benefactors, or by us. The students will be contractually expected to return to and serve in their home setting. In addition, we will do all we can to help them keep close ties with their families and others in and from their home settings throughout their learning time away from home.

h. Social determinants of population and global health are emphasised

A key theme throughout our curriculum will be a focus on the importance of "upstream" factors as influencers of health status, and an awareness beyond individual patients to the families and larger communities of which they are a part.

Although we will be developing future doctors who have the skills, understandings, and perspectives needed for rendering high quality personal health care for individuals and their families, we want them to also recognize the larger implications of health and of the absence of health. We will have learning exercises, discussions, simulations, and meetings that explore the consequences for communities and for larger population groups of our actions and inactions as healthcare professionals and as potential people of influence in our communities. We will include attention to the practices of healthcare providers (ranging from our overuse of antibiotics to our possible inattention to the long-term health consequences of bullying, smoking and other forms of substance abuse in our schools, and much more), as well as the influence of political and economic decisions. We will also pay attention to the actions taken or not taken by organized groups of doctors and other healthcare providers.

Our focus on understanding upstream factors and on population health efforts will be closely linked to the realities of local needs and circumstances. We will work with local public health resources and social agencies. Our students will participate in enough of these interactions to gain a sense of their importance in rendering modern, total health care to the population of the community they are serving.

Whenever relevant, our students will be helped to reflect on the consequences of all of these influences for the communities of which they are a part, including their country and the world at large. A key intention of our programs is that we help develop future leaders for the communities they will serve. Participation in our Educator Development Program (EDP) and in various other leadership-development experiences will contribute toward that goal. (See Section T, below.)

i. Social accountability & economic sensitivity are central concerns

The topics in this header represent another set of priorities and values that will permeate the iMEdTrust programs. As with those introduced in Sections "g" and "h", above, we are consciously setting out to give prominence to these matters in our faculty and student recruitment processes and in the many ways that our institutional values are highlighted and transmitted. We expect iMEdTrust's medical school in London and the Partner Medical Schools to be closely integrated with the communities they serve, including with their public health and other health-related resources. This will include active participation in community affairs, regular communication with patient groups, community leaders, public health officers, local health economists, schools and schoolteachers, and others. We anticipate that patients and other community representatives will be important participants in and contributors to our ongoing institutional planning and to the choices we make in the focus of our educational programs.

Along with others, we consider the "ivory tower" isolation of some medical schools from their surrounding communities to be unacceptable for us. In addition, we see our focus on the larger issues of social accountability and economic sensitivity as necessary parts of the understandings that leaders must have if they are to help shape programs that will serve their communities and countries responsibly. As already indicated, and as emphasized next, the preparation of future leaders is one of our missions. Exerting leadership requires an understanding of the challenges involved in setting priorities as a guide to allocating scarce resources. We intend to produce graduates whose values and choices are guided by a respect for evidence, systematic problem solving, and, when necessary, the defence of difficulty, even unpopular, but needed decisions that serve the best interests of the public's health.

j. Students prepared for educational and community leadership

As we have indicated, unlike most UK-based and some other of the world's medical schools, iMEdTrust's medical school in London will be a graduate-entry program. To the extent doing so will be feasible in our Partner Medical Schools in economically constrained countries, we will seek to have those schools adopt a graduate-entry policy as well. Our decision to adopt this approach is based, in part, on our conviction that medical students should be engaged in patient care from their first days following enrolment. To do that, we consider some personal maturation and additional life experiences (beyond high school) to be desirable parts of helping ensure some readiness for such activities. In addition, we will welcome older and more experienced candidates, especially from healthcare backgrounds, in part, because of our intention to encourage our students to aspire to positions of leadership in various domains.

Among our intentions is the expectation that many of our students will become educational and community leaders in their home settings, once qualified and suitably experienced. For those who choose to prepare for becoming leaders as part of their careers, as we will encourage many of our graduates to do, we will include

leadership preparation as part of their learning experiences. As previously mentioned, we will encourage students to join parts of our ongoing Educator Development Program (EDP). And selected students will be invited to consider pursuing our Master's or Doctoral program in Medical Education Leadership, when those programs are ready.

Our overall educational approach includes encouraging our students to consider themselves to be authentically on the path toward becoming professionals from the time of their entry into our program. To both take advantage of the contributions the students can make, and to help them gain the experience and perspectives needed for professional maturation and leadership, we will encourage student participation in our ongoing planning activities. They will serve as members of our committees, contribute to special event planning, engage with us in helping understand and solve problems that arise, and they will be invited to be constructive critics of our programs and processes.

Our overall educational strategies, which will feature self-awareness, reflection, self-assessment, collaboration, and effective participation in shared-leadership teams, are all elements that can contribute to the development of future leaders. These two links (here, and here) provide examples of concerted commitments to promoting self-awareness and accurate self-assessment at well-respected educational programs outside of medical education.

3. iMEdTrust's Curriculum; Part 3: Making it all happen

k. A reasonable, overarching question: How will our many goals be achieved?

In the prior two parts of this document we emphasized that throughout our programs we intend to achieve Learning Outcomes involving many content areas and process capabilities. We will do this in ways that adapt to the uniqueness of each student. We will also pursue multiple goals simultaneously during most learning sequences. You may well wonder how all these many goals can be achieved.

From the outset, we will devote substantial effort to assuring that our faculty members and students have a clear understanding of, and a commitment to, the goals, premises, values and priorities of our program. In other words, we will have a clearly defined, communicated, and consistently supported educational culture.

To manage the complexity of our learning processes we will continuously identify and track the development of each student's capabilities (skills, knowledge, attitudes, and more). We will focus on those detailed elements we regard as required for mastery of the expected outcomes of each learning sequence.

The design and management of each learning sequence will be owned by a team led by an iMEdTrust educator. The team will be comprised of educators (including educators from low resourced countries), students and learning technologists. Each team will be supported by our Health Professions Education Research Institute, which will also be responsible for quality assurance as well as for conducting and publically sharing the findings of studies of our learning approaches.

Clear expectations will be set for each learning sequence, with particular attention to the capabilities needed for achieving the expected learning outcomes. The team will also ensure that all needed learning resources are available to assist each student in assessing and managing their own learning pathways.

Our extensive uses of technology will keep the many goals of our program, and the simultaneous focus on multiple disciplines, in a "front and centre" position for the students and faculty. The students' self-study, the small group discussions, the simulation-based tasks, the local and international clinical and research work assignments will all be linked to the capabilities needed for mastering the specified outcomes, toward which each learning sequence is targeted.

Being an educator in our programs will involve a substantial commitment. Partly, our faculty will undertake extensive preparation for their educational responsibilities, and they will remain current with evolving educationally-relevant research and practices. That is, they will take their responsibilities as educators at least as seriously as clinicians and researchers tend to do in their domains. Also, partly, our educators will stay fully informed about each of their students' individual experiences and progress toward achieving their expected outcomes. Just as effective clinicians do when rendering patient care, our educators will regularly contribute to each learner's carefully-kept records and prepare appropriately in advance of each of their communications and encounters with their students.

In other words, we will provide Learning Experiences that are based on a systematic, coordinated approach. Our educational program will be conducted more like the widely accepted approaches to providing clinical care.[2] Our approaches won't be guided by top-down, administrative directives. The overall direction will derive from the carefully defined learning outcomes being pursued. These outcomes will determine the specific capabilities requiring individual learners' attention at any given time.

The faculty and students will collaborate in sorting out in advance how achieving these outcomes will be approached. Daily, formative assessments of each student's experiences and performance will help guide the process in a way that is fully transparent and individually adapted to the student's readiness and interests.

A key part of having a curriculum in which multiple categories of goals are being systematically and effectively pursued is a redefinition of the role of educator. We, along with a growing number of others, regard the traditional image of educators as literal "professors" of information and purveyors of wisdom as no longer appropriate. We see our educators as guides, coaches, and learning facilitators who do not need expertise in all of the content areas being pursued. They need to be systematic

[2] In conventional medical education there are rarely if ever such basic systems-coordination steps, such as keeping or sharing records of students' encounters with or among educators. Students only occasionally have access to information about their performance beyond their grades and some brief comments.

thinkers and skilled question-askers, not transmitters of information. The implications of this shift are profound and have not yet been widely achieved in medical education.

We expect to achieve this shift as fully as currently possible through several key decisions. Central to our mission will be a major investment in our Educator Development Program (EDP). Also vital will be our uses of, and ongoing development of, a variety of digital support technologies. In addition, a central part of our daily activities will be substantial, continuous data gathering, much of it automated, through our Adaptive Education Management System (AEMS). The information we gather from and about the students and the program will serve several short-term and long-term purposes.

With any-time access to the AEMS information, and the system's pro-active guidance (orchestration), the students and faculty will be able to function much like good clinicians or even like airline pilots. They will have immediate access to (or be presented with) appropriate decision-support data that they will use at a pace that matches the needs of the task at hand. Some decisions need to be made moment-to-moment. Others can be made at extended intervals. Both learners and educators will be oriented to thinking systematically about the learning process and will likely be eager for appropriate information in support of the decisions they recognize need to be made under various conditions. Consequently, we anticipate that our learners and educators will see themselves as collaborators in pursuing a shared commitment to the agreed-upon learning goals being pursued.

We will make every effort to guide each of our Partner Medical Schools to become fully populated with faculty members for whom the process of education is both a central career dedication and a focus of their own continuing learning. Such educators won't see their educational responsibilities as a burden or an intrusion, as is still too common among some medical faculty. They will be eager to support the pursuit of a wide variety of educational goals and will join in helping invent fresh approaches to doing so.

In addition, such faculty members and the students will recognize that the traditional approach of giving students only perfunctory comments on their performance now and then, plus an alphabetic or numerical grade at the end of each course is not nearly adequate. Serious learning, they will understand, requires meaningful information that is readily available at all times. Even more, they will appreciate that growing as a learner and becoming safe for a lifetime of patient-care responsibilities requires that they become accurate and eager self-assessors. Feedback from faculty, in our settings, will focus largely on the accuracy and appropriateness of the learners' self-assessments. Once this expectation is established and routinely practiced by learners, the feedback from faculty will only rarely need to be judgments about the learners' performance of the capabilities they are seeking to acquire and refine.

We will seek to ensure that those involved in our iMEdTrust programs will regard themselves, and will be regarded by others, as members of a large, collaborative team. We anticipate that the pace and the quality of our students' learning and our faculty members' sense of joy and fulfilment associated with meaningful accomplishments will become contagious, and will lead to wide adoption of these approaches throughout our Network and beyond.

iMEdTrust's Dictionary for Medical Education Reformers

Notes:

1. This "dictionary" is, and will remain, a work-in-progress. It is meant to help promote collaboration with others. We want it to be a useful resource for health professions educators and students. During this early phase, please use email to send us your suggestions of additional topics, recommendations of modifications of existing topics, and any other improvements you would like us to make. Use: feedback@imedtrust.org. In the next phase of this site (coming soon) you will be able to enter your comments directly on the web. Thanks.
2. These entries are brief explanations of educational ideas, principles, and practices. Some are specific to iMEdTrust's educational programs. Others apply to all educational programs in the health professions. We are not the inventors of most of what is described here. We think, however, that the accumulated effect of all of the iMEdTrust plans presented here define an approach to medical education that is largely new and different. We hope this program will come to deserve to be a source of ideas, even inspiration for others.
3. Although we don't directly cite supporting research within this Dictionary, these ideas and proposals are based on the accumulated implications of multiple decades of thinking and research by us and many others. A considerable collection of relevant references from the published literature will soon be posted in a newer version of this web site.

- 21st Century Doctors: This is our view of the capabilities[3] and attributes needed by doctors who are well prepared for providing the kinds of healthcare that their patients and others in their community most need. The central features of these doctors' capabilities are *how* they function (their "processes"). At the top of that list is their capacity for continuous learning, including their readiness to adapt appropriately in response to new science and to their evolving local populations and other relevant conditions. In addition, these doctors have the personal qualities and skills needed for establishing the trust-based relationships that are required for exerting constructive, lasting influence on others' health-related behaviours. (For more detail on this topic, please see Characteristics of optimal 21st Century Doctors).

- Action Research – to be added

- Active Learning: For learning experiences to have lasting, positive value many conditions need to be met, as discussed in several entries in this Dictionary. High on the list of needed conditions is the requirement that learners be "active", that they are directly engaged in choosing and pursuing their areas of focus and their learning tasks. In other words, they need to be engaging in the process of functioning as mature learners. For many decades, medical students were kept largely passive, especially during the first years of medical school. Much or all of the teaching was didactic. Lectures were the dominant teaching style. Gradually, in a growing number of medical schools, students are

[3] Words and phrases in blue and underlined are mostly internal links to other, related entries in this Dictionary. Some are links to external web sites.

encouraged to be more active, through small group discussions, problem-based learning, simulation exercises, and more.

- **Adaptive Medical Education:** (AME, also referred to as Adaptive Learning**)** AME is iMEdTrust's primary area of educational innovation and contribution. It will be a centerpiece of our educational programs. Our version of AME embraces a set of ideas, strategies and resources that respond to the evidence that each learner is unique. To be optimally effective, learning experiences must continuously adapt to the unique characteristics, capabilities and ongoing progress of each learner. These premises are the foundation of a set of approaches that are the basis of iMEdTrust's curriculum.

In our program, AME has two main levels: 1) the overall educational program; 2) each of the individual sets of Learning Experiences in which students engage.

iMEdTrust's overall educational program includes multiple components, all of which are important:

1. Carefully selected students
2. The support of carefully selected and well-prepared educators
3. Appropriately designed and used educational-support technologies
4. A system that continuously adapts to each individual student's current and changing capabilities, characteristics and identifiable learning needs.
5. Provision for each learner to follow optimally individualized, evolving Learning Pathways, to the extent possible, within our available resources.
6. An arrangement that encourages and supports a process in which the learners can continuously review their progress toward their expected Learning Outcomes. Their reviews are guided by their self-assessments, regular consultations with their mentors and facilitators, and by attending to the thorough and systematic records accumulated by our AMEMS (Adaptive Medical Education Management System). These records describe the experiences in which they've participated and their performance during their participation:
    - in their various Learning Modules
    - in their CLGs (collaborative learning groups),
    - in their simulated and real clinical and research experiences
    - when engaging in learning-tasks, while using iMEdTrust's AMEMS.

Learners will be continuously helped to understand how they are doing in their efforts to fulfill or exceed the three sets of Outcomes that guide their learning. To the extent feasible, learners will move through the program at a pace that is appropriate for their capacities and levels of readiness. This ambitious educational program will be supported by current technologies, which will enable us to orchestrate the learners' schedules, resources used, and Learning Pathways. Our approaches are designed to improve learning effectiveness and economic efficiency, and to provide a platform that can be adopted and adapted at zero or low cost by Partner Medical Schools and other members of the iMEdTrust Network and at reasonable cost by others.

- **Adaptive Medical Education Management System (AMEMS):** Adaptive Medical Education (sometimes, but not fully accurately, called "differentiated learning" or "differentiated education") is the centre of the iMEdTrust curriculum. Our Adaptive Medical Education Management System (AMEMS) is the technology-based resource that will provide the needed support of several critical functions of our educational program. The AMEMS will:

  1. Orchestrate the allocation of time, physical objects, space, personnel, and other resources that support many aspects of iMEdTrust's educational program;
  2. Serve as the continuously growing collection of digitally-based, interactive resources (references, tasks, simulations, schedules, personal and social communication networks) that are the foundation of a large proportion of the students' individual learning experiences;
  3. Assemble the records of multiple aspects of each learner's specific experiences, reflections, and performance (as added to the system by the learners themselves, their educators and supervisors, their peers, and accumulated automatically by the system itself);
  4. Manage the continuously changing availability of tasks, resources, and suggestions that are uniquely adapted to the learners' requests, backgrounds, accumulating experiences, and evidence of their current readiness and *needs,* each time they access the system;
  5. Enable our facilitators, mentors, clinical supervisors and other educators to remain fully current regarding the experiences, accomplishments and difficulties of those students who they are supporting;
  6. Coordinate the electronically-based communication processes among students, faculty, staff, and other members of the iMEdTrust Network, including the exchanges of private and social information (with careful attention to privacy protections);
  7. Be a source of growing amounts of rich (anonymized) data for analysis and research.

  Other functions are likely to evolve over time, based on our experiences and systematic research related to our uses of the system.

- **Agile:** (software and project development; working practices) As currently used in the contexts noted, and as we are using the term in relation to our program and technology developments, "Agile" refers to a set of practices that have grown out of the "Manifesto for Agile Software Development" offered by a team of 17 leading software developers in 2001. That Manifesto, and the practices that have evolved, are highly relevant to our overall planning and to our educational offerings, especially our plans for Adaptive Medical Education. At the heart of the practices encouraged by the Manifesto that apply to iMEdTrust's educational program are: adaptive, collaborative planning, evolutionary development, continuous improvement, and the encouragement of rapid, constructive responses to identified needs for change.

- **Ambulatory Care:** This is a general term for health care provided for people on an "outpatient" basis. That is, for people who don't stay at the clinical facility overnight, as

they do when receiving “inpatient” care, as is provided in hospitals. Ambulatory care may include diagnosis, observation, consultation, and some forms of treatment services. This term often refers to the general care provided in primary care clinics, but may include advanced medical technology and procedures, many of which are increasingly being offered on an ambulatory basis in specialized centres. These centres may be closely associated with hospitals but don’t involve an overnight admission.

- **AMEE (Association for Medical Education in Europe):** A worldwide organization with members in 90 countries on five continents. AMEE promotes international excellence in education in the healthcare professions across the continuum of undergraduate, postgraduate and continuing education. Their annual meetings attract well more than 3,000 attendees, all focused on aspects of education in the health professions. AMEE sponsors a variety of other events and resources, including an actively used web site, AMEE.org, online discussion groups, regular webinars, the professional journal, Medical Teacher, and much more.
- **Answers:** Traditionally, in medical education, a great deal of attention is paid to the accuracy of the answers students give to questions that are posed by *educators*, in person or on tests. Our iMEdTrust students will also be expected to respond to questions, which may be posed by their educators, by their fellow students, by patients, by hypothetical and real clinical or research tasks and problems. Students will also respond to questions generated by other challenges they face, including those embedded in work assignments, as well as exercises and simulations that are part of our AMEMS.

  In general, our educators and the curriculum will give less attention to the specific answers that learners give to questions than to their *process* of arriving at their answers. In addition, our educational program will be focused less on helping our students learn to answer questions and will focus more on helping them learn to ask appropriate questions. Being capable of formulating and asking appropriate questions is foundational to being an effective educator, diagnostician, clinician, and researcher.

  Our educators and our AMEMS will regularly encourage our students to formulate questions in response to what they read, to the experiences they have in clinical and research settings, and to group discussions. NOTE: the nature of our Adaptive Medical Education program is centrally involved with the use of questions and answers, but in ways that are different from conventional patterns. Whether during in-person exchanges or when digitally mediated by the AMEMS, students’ answers mostly won’t be judged for their correctness, but will serve as a guide to the educators or the AMEMS when determining what the next step in their exchange with the student should be. That is, the live educator or the digital system will “adapt” to the information that is revealed through the learner’s replies. The next step from the instructional source may be one of many possible actions, such as:

  - Additional exploratory questions
  - Invitations for the learners to formulate follow-up questions

- Encouragement for the learners to reflect on their current thinking and ideas
- A discussion of optional approaches that might be suggested by the current exchange
- and more.

- **Approaches to Learning:** In our iMEdTrust programs there will be several primary types of Learning Experiences. See individual entries in this Dictionary for each of the following: Clinical experiences; Clinical supervision; Collaborative Learning Groups; Individualized learning; Interactive learning; Mentoring; Question-based learning; Research experiences; Simulation-based learning.
- **Assessment**: (See also: Competency-based assessment; Formative Assessment; High Stakes Assessment; Summative Assessment) In recent decades, thanks to the work of many innovators and researchers, the available approaches for determining learner capabilities and ongoing learner needs have become substantially more variable and robust. At iMEdTrust we have adopted the position that continuous assessment is as appropriate and necessary for optimal learning as it is for Continuous Quality Improvement in other domains, such as health care and manufacturing. We are persuaded that health professions students (and their educators) should always have ready access to clear, helpful information on all aspects of their performance, progress and needs. As effective educators understand, ongoing assessments need to be integral parts of the moment-to-moment supervision of clinical performance. Such continuous assessment is fundamental to Adaptive Medical Education, which is the foundation of our overall program. Educators and administrators who understand these principles recognize that grades given to students at the end of a course, clinical rotation, semester or year are useless as guides to learning. They arrive too late and don't provide any of the specific information that learners need if they are to take constructive action. Grades, of course, are primarily vehicles for administrative decision-making. Also, regrettably, grades are often superficially-derived glimpses of small slices of each learner's competence and readiness, so that they can't properly serve as the basis for guiding the learners' subsequent educational decisions.

  We intend to adopt and adapt the best of available approaches that make assessment in our programs continuous, and inseparable from the students' learning experiences. These assessment approaches will be truly formative.
- **Attributes:** Please see characteristics, which we use interchangeably with "attributes".'
- **Basic Scientists:** to be added
- **Basic Sciences:** (also called "Fundamental Sciences") to be added
- **Beginner's Mind:** This implies having an attitude of openness, eagerness, and lack of preconceptions. Seeing with a beginner's mind allows us to see freshly, as if for the first time, and not be distracted or possibly misled by preformed opinions and ideas. This phrase and related ideas are derived from Zen Buddhism but they are being used increasingly more widely. This notion has an important implication for clinical care and education. It draws attention to our need, as educators and clinicians, to be as sensitive as we are able to be to the needs of our students and patients. Many of them are far less

advanced than we are in whatever topic areas we may want to explain to them at times. Adapting to the needs of beginners, or near beginners, is an important obligation and can be a challenge for educators. See "curse of knowledge".

- **Brain Maps:** Brain mapping is a large and expanding component of brain science. This is a process devoted to understanding the anatomy and functions of specific parts of the brain, at both the structural and molecular levels. For our planning we are focusing on the educational implications of the findings that, involuntarily, all of us are continuously creating connections in our brains, based on our repeated perceptions and other experiences. We each end up with many sets of established connections among groups of neurons in our brains. These sets of neurons (which we and others are referring to as "maps") are the results of the ways in which we have stored the pieces of information that comprise the memories from at least 3 sources: our experiences, our reflections and our imaginings. These maps reflect and define our uniqueness. They are the consequence of all that we have been exposed to and have accumulated up to the current moment in our lives.

  As was observed in The Talmud almost 2 millennia ago, and has been repeatedly confirmed in subsequent research, "We don't see things as they are, we see things as we are." In other words, each of us has a unique set of "filters" that influence the ways we perceive and interpret new experiences to which we are exposed. This uniqueness, and our consequent diversity of perceptions, taste, beliefs, assumptions, and values, as well as the distinctive impact on each of us of any new experiences we have, contribute to a substantial challenge in designing optimally appropriate learning experiences. It is this range of differences among learners that is a major factor in shaping the educational strategies and priorities we have chosen to be the basis of our iMEdTrust Adaptive Medical Education programs.

- **Campus:** **(See** iMEdTrust Campuses)

- **Capabilities (Competencies):** These terms typically refer to the combination of knowledge, skills and attitudes that are reflected in what we are able to do, and to choose to do. For selection among candidates, and for decisions about learners' readiness for progress in a program, and for graduation, we think that more is needed. Most measures of knowledge, skills and attitudes are snapshots of the learners' current circumstances and are incomplete (insufficient) for estimating their potential for growth and future performance. Although forecasts of people's developmental potential are imprecise and error-prone, some measures are more likely to be helpful than others. On their own, static snapshots are inadequate. We consider it important to derive measures of change over time. Beyond having measures of learners' current capabilities, we are designing our program to provide continuous information on the learners' process of change.

    - How far have the learners moved in selected time periods?
    - How open are they to recognizing their strengths and limitations?
    - How accurate are they in doing so?

- How do they approach identifying and responding to their currently recognized limitations?
- How do they approach the discovery that they don't know, or can't do, something that they now realize is important?
- How systematically, regularly, and effectively do they reflect on their performance and current capabilities?
- Are their personal goals and ambitions evolving in a constructive direction?

Having useful sources of information on such questions requires the sort of continuous information gathering that we are putting into place with our AMEMS.

- Capacity: When referring to a country's or a school's "capacity", we are implying the availability of both the quantitative and qualitative resources needed for educating appropriately-prepared doctors and other health professionals. As of this writing, most low- and medium-income countries have serious capacity shortages. iMEdTrust's mission includes a central focus on helping to alleviate this situation and its many negative consequences.

- Characteristics: We use this word interchangeably with "attributes". Both words imply some features or descriptive information about a person. Either word may refer to psychological characteristics (e.g., being insensitive or empathic) or physical attributes (e.g., being tall or short), or a cultural heritage (e.g., a person's social, geographical, religious or other background that may influence her/his perceptions, attitudes, and convictions). When we indicate such characterizations of students, faculty, or others, we always mean them to be descriptive and neutral, never judgmental. Some characteristics (e.g., psychological ones) may be amenable to modification with educational and other experiences, while others (such as physical characteristics) are stable over time and are not subject to educational interventions.

One of the distinguishing characteristics of people is the extent to which their attitudes, assumptions, and other psychological features (e.g., an inclination to be judgmental) may or may not be changeable over time, in response to suitable educational and other experiences. Although some personal characteristics are not relevant to being effective as a health professional and should not be the focus of educational efforts, others can be vitally important. For example, we consider the characteristic of being highly resistant to change in relevant areas (such as a willingness to be accepting and respectful toward people whose values are different from one's own) to be potentially disqualifying for both faculty and students.

- Charity: iMEdTrust is registered as a "charity" in England and Wales. In this context the word has a special meaning, which may be different from the way it is understood in other countries. To be registered as a charity in England and Wales an organization must define its benevolent mission(s) and methods of operation, and then be approved by the Charity Commission. This Commission answers directly to the UK Parliament, and is responsible for ensuring that approved charities adhere to their approved missions and operate in conformance with the Commission's regulations over time. In their words, their overriding

purpose is to “register and regulate charities in England and Wales, to ensure that the public can support charities with confidence.” Once registered, charities may receive donations from individuals and organizations to support their operations. Donations from residents of the UK and the EU are tax advantaged to the donors and to the charity.

- **Clinics:** (also called Outpatient or Ambulatory Clinics, or Health centres)**:** A place and its set of resources (people, facilities) where “ambulatory” health care is provided. These are places where people can receive care for various health needs, but not problems requiring overnight stays. Some clinics are in or associated with hospitals. Others are free-standing and may or may not have a direct linkage with a hospital system. Many clinics provide primary (general) care, some provide a specific form of sub-specialty care (e.g., ophthalmology, orthopedics) and some provide multiple forms of general and sub-specialty care (sometimes called polyclinics). Their sizes may range from having a single health care provider to having hundreds of providers.
- **Clinical**: As we use the term, we are implying the general topic of patient care. That is, all the processes and resources related to providing diagnostic, preventive, supportive and interventional care for people. We are *not* implying the alternative meanings that are sometimes implied by this word: cold, detached, uninvolved, or distant.
- **Clinical Experiences:** These are the participatory opportunities provided for students to help them learn the skills, understandings, and attitudes needed for becoming able to render direct care to patients. Traditionally, such experiences have been provided mainly or exclusively in hospitals. In recent years, however, the following changing conditions and growing recognitions have been contributing to changes in that arrangement:

    1. Most medical graduates provide most or all of their patient care outside of hospitals, usually in office and clinic settings. Gradually, medical schools are recognizing that learning experiences should occur in the types of setting where the resulting outcomes of that learning will be applied.
    2. Hospitals are becoming less appropriate settings for medical student learning. Because of economic pressures and changing medical practice patterns, most patients’ stays in hospitals have become steadily shorter. The opportunities that students once had to undertake extended interviews and to follow patients’ progress for days or weeks in the hospital have been disappearing. Increasingly, arrangements are made for students to have some, even many, of their clinical experiences in ambulatory settings.
    3. Portable electronic patient-monitoring devices are making it possible for growing numbers of patients to be managed without the hospital admissions that their conditions formerly required. This will likely reduce further the availability of hospitalized patients who were formerly available as contributors to medical student learning.
    4. An effort is emerging to make adjustments to correct the imbalance in the specialty distribution of doctors. Most countries and most locations in countries have a relative shortage of primary care doctors (GPs). Some medical schools

are beginning to give enhanced attention to the preparation of students for careers in primary care, which is best done outside of hospitals, with ambulatory patients.

5. In recent years there has been growing recognition that some phases and aspects of clinical learning can actually be done more efficiently and effectively with the appropriate use of simulations. Increasingly, meaningful amounts of clinical experience are being provided with simulated (standardized) patients and with other simulated experiences, in simulation centres, and with digitally-based simulation exercises on devices that can be used anywhere. Such experiences are replacing, and even improving upon some of the time that was previously spent in hospitals and other "real" clinical settings.

- **Clinical Rotations:** Dominantly, medical students' clinical learning experiences are provided in defined settings (e.g., a clinical specialty's hospital ward) for pre-specified periods of time (some number of weeks), much like the way in which non-clinical courses are scheduled and arranged in conventional curricula. The clinical experiences are often referred to as "rotations". Although the arrangement of courses and rotations as predefined segments of time may be helpful for administrative planning and control, such approaches are inconsistent with the diverse needs of different learners.

  We and some others are accepting that educational programs must make a choice. They can have controlled time and, inevitably, variable outcomes among their students. Or they can have consistent, predictable outcomes among their students, but only if they allow for variable amounts of time among learners. At iMEdTrust, as some other programs are doing, we are moving away from standardized learning arrangements with the development of Adaptive Medical Education. In iMEdTrust's programs we are adopting the position that technologies now enable far more customization of the duration and character of learning experiences, so they can be adapted to the needs of diverse learners rather than to the calendar or other administrative constraints. There are limits to how much flexibility we can offer, but our intent is to design and test a variety of approaches from which we and others can learn to be more appropriately responsive to individual differences, rather than to the clock or the calendar. (See, also, Credit, Industrial model)

- **Clinical Supervision (Clinical Supervisors):** This is a frequently used instructional process, in hospitals, in ambulatory clinics, and in some simulation settings. This process often involves one supervisor and one learner, but may involve multiple learners, with the extra members of the group being either observers of the primary exchange or participants in a group exercise, of which there are several types (see Collaborative Learning Groups and inter-professional education). Some educators become adept at the techniques required for effectively involving several or all of those who are gathered in a group, in a clinical supervisory situation. The settings for such experiences can vary, depending on the local pattern and the context. Clinical supervisory sessions may involve visiting patients at their bedsides in hospitals, or meeting with ambulatory patients in offices or clinics, conducting home visits, or other possibilities. Usually, there is some interaction with

(talking to and examining) the patient, followed by discussions between the supervisor and the learner(s) after the patient encounter. Depending on the local pattern and the supervisor's preferences, the patient may or may not be invited to be present during the review session. Some "supervisors" merely do demonstrations.

- **Clinicians:** These are health professionals who provide direct patient care. They include generalist and sub-specialist doctors, nurses, advance-practice nurses, physician assistants/associates, respiratory-, occupational-, and other therapists, dentists, social workers, psychologists, and more.
- **Coach:** (Coaching) While learning, we all can use some guidance. In complex learning, as is involved in becoming and progressing as a health professional, virtually everyone, from beginners to experts, can benefit from the help of a suitably-qualified coach. In non-clinical fields, even those people who are considered the best in the world in what they do (think of musicians, athletes, actors) depend on a coach's (director's) guidance to correct problems that have emerged, and to know what most needs their attention at any given time. Becoming a highly effective coach who has mastered the process of guiding other people's learning (identifying their accomplishments and their most appropriate next steps) is itself a complex, long-term learning process. Insufficiently prepared coaches can do both short-term and long-term harm, partly by interfering with a learner's current development and partly by discouraging interest in their field of work. A major part of our Educator Development Program (EDP) will be devoted to helping our faculty members become highly effective coaches. For more on coaching, see feedback.
- **Cognitive:** In brain science, psychology, and education, "cognitive" or "cognition" refers to a group of mental processes that include: attention, memory, producing and understanding language, solving problems, and making decisions. These terms have different implications in different disciplines. For our purposes, our focus is primarily on cognitive science as it pertains to information processing and memory, and their implications for learning and performance.
- **Collaborate:** (Collaboration) To be defined.
- **Collaborative Learning Groups:** (CLGs) This is our phrase for a particular approach to learning in small groups, which will be an important part of iMEdTrust's educational programs. Most of these groups consist of up to 8 students and, some of the time, one or two facilitators. The members of these groups work together, interactively, for part of, or for a full term. The areas of focus of these exchanges typically involve a set of problems, situations, simulated activities, clinical events, or other explicit tasks, all related to the learners' current levels of readiness and their shared, expected threshold learning outcomes. In each group the process will be managed by a primary facilitator, but the general direction of the process will be increasingly shifted to the students when, and to the extent they are ready. The topics and the complexity of the exchanges will be guided by and adapted to the identified needs, interests and recent experiences of the learners in the group, which the learners and the facilitator(s) will have routinely available through the Adaptive Medical Education Management System (AMEMS). Some of the goals of these

CLGs are the knowledge/understandings, attitudes, and skills deriving from the learners' expected outcomes. In addition, a central purpose of these learning events is helping ensure that our students move toward having a high level of understandings and skills needed for being effective participants in the collaborative, teamwork-based environment of contemporary healthcare. (For illustrations of these processes in action, we will soon add links to 2 student stories.)

- **Compassion:** A set of personal characteristics and emotions that are especially desirable for those in the helping professions, particularly health professionals. These characteristics include being inclined toward responding to people in need with sympathy, empathy, understanding, caring, sensitivity, warmth, considerateness, kindness, humaneness, and generosity. Compassion motivates those of us with these characteristics to find ways to help others. We consider it reasonable to focus on the presence of these characteristics in applicants to careers as doctors or as other health professionals. Although there are health professions that require minimal direct patient contacts (e.g., some sub-specialties of pathology and radiology), our focus at iMEdTrust is on educating potential primary care doctors and other front-line clinicians as well as future educators and leaders, all of whom will be inclined to serve the under-served. We regard a capacity for genuine compassion as vital for all of these domains of professional work.
- **Competence:** An individual's relevant, current levels of demonstrable capabilities in relation to one or more of the specific learning Outcomes that are required or desired in a specific educational program. Competencies are normally expected to grow continuously along a path toward or beyond the outcomes meant to mark the learner's successful fulfillment of the graduation requirements in that area. In our iMEdTrust programs, as part of our process of continuously collecting and summarizing each learner's record of experiences and performance, our students will always have available throughout AMEMS a clear sense of their current accomplishments and status along that path toward the outcomes.
- **Competency-based Assessment:** The processes of assembling relevant information and exercising the judgments needed to determine an individual's levels of capability in relation to expected learning outcomes. To the maximum extent that is feasible, the assessment should be designed to be reliable and valid.
- **Competency-based Education:** Education that focuses on the outcomes of learning, with an emphasis on the learners demonstrating explicit abilities, in addition to demonstrating the possession of knowledge. These abilities may include such tasks as solving specific categories of problems, demonstrating specific communication skills, or performing explicit tasks (such as doing a neurological exam on a patient).
- **Consolidation of Memories:** There are several steps in the process of storing memories for later access. Consolidation is a vital step in the process. It is needed for memories to last more than a very short time. Unless several conditions exist and are functioning properly during and after any experiences we have, those events in which we engage don't get reliably consolidated into retrievable memories for future use. Even if they are

meant to be learning experiences, memories of those events may not remain reliably available for our use when they are needed later. In other words, human memory can't always be counted upon when we need it. In still other words, the learning process is now fairly well understood and, regrettably, it doesn't always work in ways that our inherited educational traditions had assumed it would.

- **Content:** (in and of education): This term is meant to embrace the specific knowledge, skills and attitudes that are the focus of an educational program. In traditional programs, "content" tends to imply what the educators set out to deliver. In some programs, content is perceived as the outcomes that all students are meant to achieve. Commonly, the focus of content is on information and secondarily on attitudes/values, and skills. Relatively recently there has been a growing shift away from thinking of content as the substance and abilities that the program is conveying, to an awareness that we need to give primary attention to what is successfully assimilated and retained for later use by learners. As we are doing in our iMEdTrust curriculum, a small but growing proportion of medical education programs are giving significant attention to "process".

  The content *of* education is "what" gets learned. The process *of* education is "how" that learning happens. Process can itself be content. In contemporary medical education, content is made available to learners from many sources, in addition to live educators and written materials, which were the dominant resources of the past. Now, content is likely to be available from digital media (tablets, laptops, phones); static and dynamic repositories on the internet; simulation exercises; friends and others in social networks, and more.

- **Continuing Professional Development (CPD):** This phrase embraces many different kinds of learning experiences offered to health professionals who have completed their basic preparation and are, typically, engaged in some aspects of clinical practice. In some specialties and in some countries, clinicians are required to accumulate some measure of CPD annually. Often, these experiences are measured in terms of hours of CPD recorded, not in terms of outcomes achieved. In the US and Canada some clinical specialties have adopted the relatively recent approach known as Maintenance of Competence (MOC). The focus includes attempts to measure competence (although, largely through knowledge-based testing), while also attempting to find ways to assess demonstrated performance.

- **Continuity of Care:** (in patient care and in education) - to be added

- **Conventional:** (traditional) We use the words "conventional" and "traditional" as identifiers of a subset of medical education programs and approaches that derive from practices, assumptions, and habits from the past. Some of the world's medical schools still follow education strategies that are not meaningfully different from approaches devised decades or even centuries ago. These strategies were chosen in the absence of the understanding of recent scientific findings about the human learning process. Another subset of the world's medical schools has taken partial steps toward reform and modernization. But, given the common practice of not being highly discriminating about the attitudes and instructional competencies of those who serve as teachers, the reality of the daily experiences of students can vary from highly constructive to overtly hurtful. It isn't difficult

to identify influential role models in the same institution who, either knowingly or unknowingly, are working at cross-purposes to each other. For example, some promote thoughtful reflection and decision-making in their instructional approach, and others expect mindless memorization of disconnected facts. A small subset of the world's medical schools has taken large-scale steps toward enlightened, evidence-based reform, although we're not aware of any that has yet gone quite as far in their overall program design as we are proposing to do.

- **Course** (of study)**:** Typically, this refers to the package of events, activities, and expectations that comprise a section of a curriculum. Traditionally, "courses" have been perceived in terms of one of the disciplines related to medicine. For example, there may by a physiology course, or a course in obstetrics. A relatively recent trend in some programs has been to have courses defined in terms of a set of capabilities that transcend the traditional disciplinary boundaries. For example, there may be a course in clinical problem solving, or in influencing patients' health-related behaviour.

- **Creative Commons:** (also see Open Source licensing) (The following is adapted from the Wikipedia introduction to this topic.) Creative Commons (CC) is a non-profit organization devoted to expanding the range of creative works that can be shared with others, with conditions specified by the "creators" for the legal use and further sharing of their creations. Creative Commons licenses do not replace copyright, but are based upon it. They replace individual negotiations for specific rights between copyright owner (licensor) and licensee, which are necessary under an "all rights reserved" copyright management, with a "some rights reserved" management employing standardized licenses for re-use cases where no commercial compensation is sought by the copyright owner. The result is an agile, low-overhead and low-cost copyright-management system, for the benefit of both copyright owners and licensees. iMEdTrust uses one of these licenses.

  The following is an example of such a license: "This is an open-access item, distributed under the terms of the Creative Commons Attribution-Non Commercial-No Derivatives License 4.0 (CCBY-NC-ND), where it is permissible to download and share the work, provided it is properly cited. The work cannot be changed in any way or used commercially."

- **Credit:** (Course credit; Credit hours; Carnegie Units, Student hours)**:** Accumulated time is a common way of "keeping score" in secondary schools, colleges and universities, although the details of the approaches used to derive the calculations may be different in different programs and in different countries. For example, many secondary school systems grant one credit for each completed course in which a passing grade was received. Many colleges and universities use some form of accounting for "contact hours"; that is, a way of recording the time spent (usually, per week) by students in contact with an instructor (in class, in laboratory, in personal supervision). Many medical schools require applicants to present evidence of having accumulated some minimum number of course credits as part of becoming eligible to be considered for entry to their program.

Just as our regulators, the General Medical Council (GMC). have chosen to do, **i**n the iMEdTrust programs we will give our primary attention to the outcomes of learning experiences, not to how long they take. An important part of the work of our Health Professions Education Research Institute will be devising and validating effective ways to record and summarize learners' achievements, partly for their ongoing information, and partly to ensure that they receive appropriate recognition for their accomplishments.

In our selection of candidates we won't be paying much attention to course credits. We won't be granting credits as our way of recognizing learning achievements in our program. We have serious reservations regarding two fundamental assumptions that underlie the notion of course credits: 1) that time spent in instructional events provides a reasonable measure of the amount of lasting learning that occurred; and 2) that learning experiences are roughly equivalent no matter what the educational process used, no matter the competence of the educator(s) involved, and no matter what the number of students per educator ratio might be. The conventional credit system appears to be a large-scale compromise or misunderstanding that is long overdue for radical reform.

- **Culture:** (Educational culture; See, also, Institutional Culture): In our use, the meaning of the phrase "educational culture" of a medical school or similar institution derives from the general, anthropological meaning of "culture": that is, the commonly shared customs, beliefs, attitudes, and practices of the members of the group involved. In our case, those involved include the faculty, administration, staff, and students associated with the educational program.

  An institution's culture can be an overriding force in shaping its programs. The culture can diminish, even eliminate the impact of ideas and initiatives that run counter to its prevailing assumptions. The established culture can be a force for desirable stability, and it can also prevent innovation and needed adaptations. Culture can be oriented to growth and transformation, supporting the work of continuous, constructive reform. Often, cultural influences are unrecognized and may lead to consequences that weren't intended by the planners or even by those who are currently in charge. For an example of the well-documented expression of this circumstance, see Hidden Curriculum.

  One of the distinguishing features of the iMEdTrust approach is the major emphasis we are placing on clarifying, emphasizing, and supporting our cultural characteristics. We are doing this though our Educator Development Plan (EDP), our carefully planned and implemented processes for selecting our students and faculty, our high level of encouragement for all members of the iMEdTrust family to gain and sustain a sense of "ownership" of the culture and its consequences, among other steps, some of which are clarified in our curriculum characteristics.

- **Curriculum:** Curriculum is commonly defined as the sum of all that an educational program offers. Gradually, in medical education, curriculum is coming to be conceived in terms of the Outcomes that are intended in the learners' capabilities and achievements. (See iMEdTrust's Curriculum.)

- **"Curse of Knowledge":** (Being "unconsciously competent"): This is a common phenomenon, in which the process of becoming highly informed and experienced regarding a topic, procedure or domain can bring with it a loss of awareness of the perspectives of others, especially beginners or even of anyone who is less advanced than the person who has arrived at this stage. The implications for conventional education, in which "teachers" function by presenting and explaining, are profound. Many of us have been at the "losing" end of this process when finding ourselves bewildered by the "user guides" that accompany some new technologies. Many of these guides are written by people who know their topics very well, but have little awareness of, or sensitivity to, the needs of relative newcomers.

  We can also experience this phenomenon when seeking navigation guidance from a local resident of a city that we are visiting for the first time. A common experience in such situations is to be told how very easy to find our destination: "You can't miss it." Too often we do miss it, partly because the explainer has long forgotten that there were some potentially confusing decision-points along the way. For them, those decisions have become virtually automatic and are now perceived by them as "easy".

  A challenge in medical education, in which so many educators are experts in the fields in which they are asked to offer instruction, is helping them learn to have a "beginner's mind". For some people, developing that awareness can be a major, even impossible, undertaking. Helping our faculty undergo that heightened awareness of the perceptions and needs of beginners, when needed, will be one of the main goals of our Educator Development Program (EDP).

- **Dashboards:** When using computers, especially with the internet, "dashboard" has come to mean one or more screens where a user can view and manage information that they and/or a system collects relevant to their work or themselves. In our Adaptive Medical

- **Debriefing:** This is an important component of Learning Experiences that are based on actions that were taken by learners. Debriefings are widely used in a variety of settings, such as with pilots after a flight, with military and rescue personnel upon return from a mission, and with health professions students following engagement in a simulated exercise or an encounter with a real patient (among many other types of learning situations).

  Debriefings are processes that can take varying forms, including general reviews of events that occurred, exchanges with peers and supervisors about decisions that were made, and assessments of the outcomes of an event. In education, debriefings are opportunities to reflect with others after participation in what has usually been an immersive activity. In the iMEdTrust educational programs we are choosing to have most debriefings take a specific form. They will occur quite soon after a learner has participated in a simulated or real clinical encounter, nearly all of which will have been video-recorded. Each debriefing will be managed by a well-prepared facilitator (who may be a faculty member or a student).

Typically, if one student was engaged in a learning experience (such as with a simulated patient), then that student will be the primary focus of part or all of a debriefing session. Usually there will be other students present who witnessed the event being reviewed. Everyone present will be familiar with and will be committed to adhering to the debriefing "ground-rules". With new groups, the facilitator will usually begin a debriefing by confirming that everyone is familiar with, and comfortable with the ground-rules, and will then ask the primary learner if she/he has anything the group needs to know, about themselves, their preparation, or the goals they had planned to pursue before undertaking the event that is to be reviewed.

Before the review begins, the facilitator's next tasks are to ensure a safe, trust-based environment, and to encourage the primary learner to share his/her thoughts about what had gone well and what didn't, and then to focus on identifying those moments during the review. The learner may also need to be reminded that some of the most important parts of the event won't be shown on the recording; they are the feelings and thoughts that she/he had during the event. Those "hidden" experiences are especially important at the "branch-point" moments, and may need to be prompted, as they can enrich the learning that derives from the experience for the primary learner and for everyone else who is present.

If the original learning experience involved a group of students, as in an inter-professional team exercise, then all members of the group will typically be part of the debriefing. In general, all of the principles and practices noted for an individual learner would apply to, or be adapted to, the group-learning event.

- **Declarative Learning:** (also called "explicit" learning)**:** This is the form of learning that we demonstrate through verbal expression. Memorized information is a form of declarative learning. The brain structures and processes involved in declarative learning are somewhat different from those involved in "procedural" ("implicit"; performance) learning. Optimal educational planning and practice require an understanding of these two categories of learning. Since a capacity for being a lifelong, effective learner must be a high priority outcome for all medical graduates we will devote an unprecedented level of attention to helping our faculty and students understand these forms of learning and their implications for educational program design.
- **Deliberate Practice:** Based on years of systematic research, K. Anders Ericsson coined and recommended this phrase to describe the learning condition that is a foundation element of gaining expertise, primarily in performance domains (procedural learning), whether in competitive sports, musical instrument mastery, or doing surgery. He has helped us recognize the important difference between mere repetition and repetition accompanied by self-assessment and deep reflection, as well as timely and accurate feedback, among other elements associated with effective coaching.

Ericsson and others have also documented the extraordinary amount of practice that is part of the background of those who achieve high levels of expertise in their field of activity. These researchers assert that extensive, deliberate practice is ultimately more

important than any so-called inborn talent. Also implied in these findings is the need for unusually high levels of motivation and dedication, which are needed for undertaking the substantial amount of practice needed for achieving mastery in complex areas. For our purposes, we propose that part of our challenge in devising a medical education program of the highest quality is ensuring that we cultivate — and avoid anything that might diminish — our learners' capacities for dedication and motivation toward persistently pursuing high standards in all the professional work they do.

In situations where students aren't effectively supervised, there is a risk that they will practice and establish incorrect ways of performing the skills they are seeking to learn. Later, the process of helping students change their established patterns can be a large and difficult challenge, often requiring a supervisor with specialized understandings and skills. Changing deeply engrained patterns can be a slow and uncertain process.

- **Diagnostic Assessment:** (Diagnostic Mindset; Diagnostic Workup**):** As they do in patient care, diagnostic assessments should play a vital role in education, faculty selection, and student selection. At iMEdTrust, our position is that in education we are just as obligated to do an initial diagnostic workup with each learner, and to maintain a "diagnostic mindset" throughout our relationship, as we do when serving as clinicians with patients. That is, we have the same obligation to respect each learner's uniqueness as we do with each patient, and to maintain an ongoing orientation of searching for signs of changing characteristics and needs over time. In other words, just as good clinicians do, we are persuaded that educators need to remain perpetually "diagnostic", never assuming that an earlier observation or decision about a learner is necessarily still accurate or relevant. We will bring this "diagnostic mindset" to our selection of and development of both our students and our faculty.
- **Diagnostic Decisions:** In education (as in clinical patient care) our planning needs to be based on information we gather about the learners we are seeking to help. In the iMEdTrust program, as in clinical care, we regard the diagnostic process as needing to be continuous. It is a fully integrated component of our continuous formative assessment, coaching, supervision, and mentoring.
- **Digital Immigrants:** (To be added)
- **Digital Literacy:** (also**,** Digital Natives) Since the year 2000, students entering higher education programs have been increasingly experienced with and comfortable with using digital resources. Many faculty members (who were described by Marc Prensky as "digital immigrants", as contrasted with their students, who he characterized as "digital natives") have not kept up. This "digital divide" between many faculty and many students is slowly diminishing, but will likely continue to be a factor that needs to be considered when planning a new educational program, as we are doing for the iMEdTrust programs. There are several components involved in being "digitally literate". The following are several elements we consider relevant to our program: (Adapted from, "Understanding Digital Literacies: A Practical Introduction", by Jones and Hafner): The abilities to:
    - Quickly search though and evaluate masses of information

- Create coherent reading pathways through complex collections of linked texts
- Make connections between widely disparate ideas and domains of experience.
- Shoot and edit digital photos and video.
- Create multimodal documents that combine words, graphics, video and audio.
- Create and maintain online profiles and manage online social networks.
- Explore, navigate, and interact in virtual environments.
- Protect one's personal data from being misused by others.

- Digital Natives: – definition to be added

- Digitally-based Learning Resources: The shift from analog-based to digitally-based information and record-keeping (from printed books and documents to records that are accessible from anywhere via digital devices) is enabling learning environments and experiences to be increasingly individualized. Thanks to learning resources that are continuously customizable and always accessible, student-centred, personalized learning is now feasible. The content, process, and pace of tasks, exercises, and information searching can be adapted to the unique needs, characteristics and readiness of individual learners. The large and growing transition from print to digital resources has the potential for making increasingly available to learners almost everywhere a wealth of learning resources, reducing or eliminating their previous economic and geographical constraints.

Taking proper advantage of the potential of these digitally-based resources, which can support serious learning, requires that educators have a deep understanding of how multimedia, multimodal learning resources can enrich a medical curriculum. The digital world in which we now live requires that students and educators be digitally literate and that our educators be educationally sophisticated. At iMEdTrust, in recognition of those facts, we are investing substantial time and resources in our student and educator selection programs and in our Educator Development Program (EDP).

- *Education Management System* (AMEMS): All users will have access to the dashboards where they can review many categories of information about themselves, their Learning Experiences, the outcomes that they are required to achieve as well as additional outcomes they've chosen to pursue. This will also be the place where students will be able to record and review their personal reflections and logs of their performance, and their current state of achievement along their paths toward fulfilling their own and the program's expectations. In other words, the dashboards will be each learner's portal to their ever-present source of information about their own performance status; that is, it will always be available as a source of the constructive feedback that is a central component of formative assessment, Adaptive Medical Education and Mastery Learning.

- Education Program: This represents the overall iMEdTrust effort on behalf of all learners, toward bringing them to mastery of all their needed and expected learning outcomes (or beyond). The program is composed of Learning Modules (Groups of Learning Experiences that, together, lead to mastery of a set of desired, related outcomes). Learning Experiences are specific learning events, such as a Collaborative Learning Group meeting

that is focused on, say, an orientation to using the iMEdTrust Adaptive Medical Education Management System (AMEMS). Learning Experiences, such as in this example, support the achievement of "enabling" outcomes (that is, intermediary "stepping stones"), which are part of building the foundation (milestones; thresholds) needed for achieving the ultimate goals of reaching the program's expected and desired learning outcomes.

- **Educational (learning) Journeys:** *See* Learning Pathways

- **Educational Outcomes:** See Outcomes (of learning).

- **Education-support Technologies:** (See, also, Digitally-based Learning Resources): In addition to the digitally-based learning resources indicated in the linked entry, these technologies embrace a range of currently available and emerging resources that can help make learning substantially more efficient and effective. Among those resources are computers, tablets, smartphones, wired and wireless networks and related communication devices, video recording, storage and searching capabilities, a host of simulation-support resources that include a wide range of levels of complexity and fidelity. In addition, these technologies include software that enables provision of interactive learning experiences, adaptive levels of task assignments and assessments, continuous record-keeping and data analysis, as well as the orchestration of all of the support resources, including people and the allocation of experiences and learning spaces. For additional information on this subject, please see the Wikipedia entry.

- **Educational Technicians**: Those are people who support our educators (those who are mainly subject-matter experts) as they devise and test the experiences, tasks, and related resources for enabling individualized learning and assessment, especially as part of our AMEMS)

- **Educator Development Program (EDP):** The EDP is iMEdTrust's intensive and extensive set of experiences for helping our faculty (and most students) learn about and contribute to our culture and educational approaches. We consider this a vital component of our "fresh start" to our educational program development. Our EDP is a core feature of our overall program, and is likely without precedent in medical education. We will make a large investment in helping our faculty members prepare for their responsibilities as educators. For more about this initiative, please see iMEdTrust's Curriculum, Part 1, Section C.

- **Educators:** This is our preferred designation for those who contribute to our students' learning. Our use of this term is partly a reflection of our decision not to use the term, "teacher", as explained in the entry for that word. Mainly, we are seeking to emphasize that those who are typically designated as teachers in conventional medical education programs have had little or no preparation for their instructional and assessment responsibilities. Our educators will uniformly have been, and continue to be, active participants in and contributors to our ongoing Educator Development Program, and will have arrived at a high level of competence in the many areas involved in helping others learn.

- **eLearning:** (or “e-learning”): This term refers to various forms of electronically-based (digitally-based, and often internet-based) guided learning experiences. Those that are currently available are quite variable in their approaches. A good proportion are simply classroom lectures that have been recorded and are being distributed via digital media. Some aspire to being interactive, although the reality of the extent of actual interactivity they provide is widely variable. A small but growing subset of eLearning providers claim that their resources are “adaptive”. As of this writing, however, an effort to sample widely among the most promoted of the eLearning platforms reveals that whatever adaptivity is provided is quite incomplete. Their responsiveness tends to be to groups rather than to the needs or readiness of individual learners.

  We have not yet found a system that successfully provides learning tasks and expectations that change continuously in response to each learner’s performance. Designing, researching, refining and implementing just such an adaptive system is a significant component of iMEdTrust’s educational program. Our Adaptive Medical Education Management System (AMEMS) will often be used by one learner at a time, although they will be designed to also support some of our collaborative learning experiences among pairs and small groups of learners. For more information about this increasingly important component of eLearning in many disciplines, at many levels, please see this web site, or the main Wikipedia entry about educational technology. Also, consider accessing the fine book on this subject, by Herrington and colleagues, “A Guide to Authentic e-Learning”. It is listed among our References. As part of our overall implementation of education-support technologies, we are implementing a highly robust e-learning system.

- **Emotional Accessibility:** A vitally important component of the process of having a positive impact on patient outcomes by health professionals, and on student learning by educators, in many situations. This refers to a large part of the communication process when dealing with the range of issues involved in effective health care and in learning. Both health care and learning can require emotional connections, especially when trust is needed, such as when intimate subjects of concern or other feelings are relevant and involved, and whenever something more than a mechanical exchange is desired or needed. (“Any doctor or teacher who *can* be replaced by a robot…deserves to be.” *H. Jason*)

- **Emotional (and Social) Intelligence:** (emotional literacy): These are personal characteristics that embrace:

  - Self-awareness
  - Self-management
  - Social awareness
  - Relationship understanding and management.

  These characteristics and capabilities are centrally important to both educators and clinicians. They will be core components of our Educator Development Program (EDP) and our ongoing areas of focus during our educational and assessment activities. We all have emotional experiences, although some people are considerably more aware of these

internal experiences than are others. For iMEdTrust our focus is primarily on the vital role we have come to understand that emotional states and attitudes can play in facilitating or diminishing the value of learning experiences. The extent to which we differ in our capacities to perceive our own and others' emotional states are part of the larger domain that Daniel Goleman has brought to our attention in his pioneering work, *Emotional Intelligence*, which has been updated and elaborated upon by him and others.[4] We are coming to understand with increasing clarity the vital importance of emotional intelligence in determining the effectiveness of educators and health professionals.

- **Empathy:** The capacity to understand and share the feelings of another, to come as close as possible to perceiving and experiencing the world as another person does. This is a complex set of emotional and cognitive capacities, which need to be cultivated and continuously refined. Empathy is foundational to being optimally helpful as a clinician and as an educator. Educators who lack the capacity for empathy are not only unable to help others develop these important capabilities, they are unlikely to be as helpful as they might be in any of the instructional or clinical efforts they undertake.

  To help others, we need to recognize their experiences of the world and adapt accordingly. Anything else is being "standardized", much like a mechanical, non-adaptive machine. A substantial part of what happens daily throughout the world of medical education is, in fact, highly standardized, including pre-packaged lectures, fixed times for learning, timed tests, and much more. Typically, those events bear little relationship to what most of the participants need. (Such "education" is much like offering a medical treatment without first formulating and being guided by a diagnostic formulation.) Optimal clinical care and education both require an empathic connection to the person being helped, so that appropriate information can be gathered and plans made, with subsequent moment-to-moment adjustments, as needed.

- **Enabling Outcomes:** These are the specifications of the expected incremental outcomes of most individual Learning Experiences. Cumulatively, the fulfillment of groups of related enabling outcomes provides the foundation needed for reaching milestones (thresholds) that build toward mastery of one or more of the more complex, ultimate outcomes that are expected as the intention of our overall educational program, preparing students to qualify for graduation and registration by their regulating authority.

- E**ntrustable Professional Activities (EPAs):** **"**EPAs are those professional activities that together constitute the mass of critical elements that operationally define a profession" (ten Cate & Scheele, 2007). EPAs are being increasingly adopted by programs focused on clinical education. They provide a way of becoming more systematic and consistent in shaping both education and assessment. Dr. ten Cate recently updated his definition in the *Journal of Graduate Medical Education*, as follows: "EPAs are units of professional practice, defined as tasks or responsibilities that trainees are entrusted to perform

[4] A compilation of Relevant References will be available on our web site, later.

unsupervised once they have attained sufficient specific competence. EPAs are independently executable, observable, and measurable in their process and outcome, and, therefore, suitable for entrustment decisions." Expecting clinical educators to define EPAs carefully and precisely is consistent with the premise that achieving mastery learning requires an explicit set of expected outcomes. Similarly, offering Adaptive Medical Education, as we will do at iMEdTrust, demands clarity in the specification of expectations.

- **Eustress:** In the educational context, this term identifies the level of stress (challenge) that is constructive, that learners find energizing and motivating. It falls on a continuum between insufficient stress and excessive stress (distress). Eustress is subjective. There are wide differences among people as to how broad is their range of sources and extent of stress that they experience as constructive. This is an important component of the need for customized, Adaptive Medical Education, and is based on extensive learner self-awareness and program sophistication in understanding each learner as an individual. Insufficient stress can be demotivating and contribute to disinterest. Excessive stress can be debilitating, causing emotional and/or total withdrawal, or hurtfulness, when withdrawal isn't readily available. Programs that are insensitive to the stress levels they are producing in their students are usually less efficient and effective than they may want to be or imagine they are.
- **Experiences:** See Learning Experiences
- **Facilitators:** These are the educators in our program who are responsible for leading the planning and management of group learning events, especially our Collaborative Learning Groups and our supervised activities in the Simulation Centre, in the ambulatory clinics, in the research groups, and in hospitals. Like all of our educators, they will have special backgrounds and preparation that enable them to expertly foster other people's learning. They will design experiences that are engaging, participatory (*interactive*), outcomes-focused, and respectful of the uniqueness of all individuals in the group. In brief, these facilitators will have become convinced that learners must accomplish their own learning through what they do. These educators will perceive their own responsibilities as including the selection, design, monitoring, and management (as needed) of the experiences in which the learners engage.
- **Faculty Development** (see Educator Development Program) – to be added
- **Family Medicine:** (General Practice): According to the World Organization of Family Doctors (WONCA), the goal of the medical specialty of family medicine is to provide personal, comprehensive, and continuing care for individuals in the context of their family and community. Typically, as an inter-professional team, family physicians and their colleagues provide care for people of all ages and both genders, with a wide spectrum of problems and concerns. The team uses a wholistic approach that integrates that biological, clinical and behavioural sciences. (See, also, Primary Care)
- **Feedback:** Biological feedback loops are vital components of the self-regulatory mechanisms that keep our body systems within acceptable ranges (maintaining

homeostasis). Automated feedback systems keep our buildings at desirable temperatures, and verbal feedback is widely used in military, corporate and other training programs. As commonly used in human organizations, feedback is the transmission of corrective information from a supervisor or trainer to a learner or subordinate about an action or process in which the learner has engaged. The intention of such feedback is usually the improvement of subsequent performance of that task or action.

Put another way, we all need to understanding the results of our thinking and behaviour, as well as we can usually benefit from guidance on alternatives we should consider, if we are to continue improving. In some human activities, such as learning to play the piano or learning a sport such as tennis, it is often possible to know immediately if the results of our actions are not what we intended. The experience itself provides feedback. In complex communication systems, such as those we need to engage in as educators and clinicians, the consequences of our behaviors are seldom that obvious.

In most aspects of human performance, most people, from beginners to experts, can benefit from the help of a suitably-qualified coach. Even people who are considered the best in the world in what they do (think of musicians, athletes, actors) depend on a coach's guidance to correct problems that have emerged, and to know what most needs work so they can improve their future performance. Becoming a coach who is competent at the process of providing feedback that is timely, welcome, constructively helpful and neither overwhelming nor rejected is itself a complex, long-term learning process. Insufficiently prepared coaches can do both short-term and long-term harm, partly by interfering with a learner's current development and partly by discouraging interest in the field of work associated with the hurtful coach. A major part of our Educator Development Program (EDP) will be devoted to the effective provision of feedback as a central educational strategy. As we emphasize under self-assessment, different kinds of feedback are needed as people move along the continuum of learning, from being beginners toward the stage of becoming experts.

- **Fellows:** (Fellowships): Some graduated medical doctors undertake additional learning time (one or more years), beyond their basic, specialty-focused postgraduate experiences (as a "resident" in the US, "house officer" in the UK), pursuing more in-depth (more specialized) experiences. For example, a Family Medicine specialist may undertake a fellowship in Geriatric Medicine. Or an Internal Medicine specialist may devote two or more years of fellowship to becoming a cardiologist, or pursuing a focused clinical research experience in an area of personal interest. These people, referred to as "fellows" in the US, Canada, and in some other countries, (and as "registrars" in the UK) tend to be called upon to contribute to medical student learning, usually as supervisors of the students' clinical experiences. The terms Fellows and Fellowships are also used in other ways in medicine. For example, various Royal Colleges in the UK, such as the Royal College of General Practitioners, award the Fellowship title in recognition of distinguished professional service some years after Membership.

- **Fidelity:** (of Simulations)**:** Simulations can represent a wide range in the extent to which they approximate reality. They can be extraordinarily simple and provide only a partial suggestion of reality (that is they are very low fidelity devices), such as using an orange for the first stage of learning the skill that will eventually involve inserting an injection needle into human skin. A high fidelity simulator may be nearly indistinguishable from the reality it is representing. There are many commercially available "mannequins" that can provide highly complex, near-real, computer-managed experiences while a learner is doing a procedure, such as delivering a baby, managing surgical anesthesia, and much more. Also, commonly employed in health professions education are "standardized" (simulated) patients, who, like the most sophisticated mannequins, closely approximate a real experience (that is, their "fidelity" is especially high).
- **Formative Assessment:** (See also, Summative Assessment, Self-Assessment) This is the gathering of information about a learner's performance during learning experiences for use in providing constructive guidance to the learner, to help "form" (positively influence) their continuing learning. The frequency with which formative assessment information is gathered and how it is used can be critically important in determining the extent of its value to learners.

  In our program, we will be gathering formative assessment information and making it available to learners and their educators on a virtually continuous basis. We regard assessment and supervision/coaching to be inseparable, and our approach may be somewhat unusual.

    - We will be assembling large amounts of descriptive information (e.g., video recordings of most learning encounters, in meeting rooms, in the simulation centre, in the clinics in which students see patients; as well as digital records of each learner's interactions with our AMEMS).
    - Learners will be consistently expected to engage in self-assessments, and their educators will assess and provide feedback on the accuracy and incisiveness of these self-assessments.

  Our form of continuous formative assessment is at the core of our Adaptive Medical Education curricular approach. The data we gather for the purposes of formative assessment will simultaneously be accumulated toward our being able to make valid and reliable summative decisions about the learners' performance and their progress toward mastering the expected learning outcomes. The information will also be accumulated, anonymously, toward providing an analyzable database in support of our ongoing educational research program, as part of the work of our Health Professions Education Research Institute.
- **Framework:** (Educational) In education, a framework is the foundation on which the specifics of the program are developed. Commonly, frameworks are part of outcomes-based education, as we will have in our program. The framework is meant to define both the standards to be achieved (or surpassed) by all students, and the main processes that will be the defining characteristics of the educational program. The curriculum should be

aligned to the standards and processes specified by the framework. Traditional education, by contrast, tends to be mainly (sometimes, nearly exclusively) concerned with delivering content.

- **Gamification:** (of education) Commonly, games have been thought of as distractions and entertainments (and by many, as wastes of time). In recent years there has been a growing recognition that some games, especially digitally-based (video) games, have characteristics that educators have longed for in their work with students. Well-designed video games manage to appeal to some people with strong holding power, characterized by high levels of motivation, dedication, and persistence, all of which are characteristics that are desired but rarely achieved in educational settings. A small and growing amount of research is devoted to determining what makes some games so engrossing, and whether there is anything we can learn from them that could be applied to learning experiences in general. Many popular games can be described as having the following characteristics: They are carefully-designed systems in which participants engage in a set of tasks, problems to solve, or conflicts, with:

    - discoverable rules that are applied equally and fairly to everyone
    - defined stages of progress
    - challenging but achievable outcomes.

  Seeking to gamify education involves defining the elements that enable some games to be far more appealing to some people than conventional education tends to be. Once those processes have been identified, some educators now argue, they can be applied in non-game contexts so as to have a constructive influence on learning and on achieving lasting, desirable behaviors. In education, some examples of desired student behaviors, which gamification can potentially influence are: attending class more regularly, staying focused on desirable learning tasks, and taking initiative in the pursuit of learning.

  Among the components of games that some educational researchers are using in an effort to motivate learners and enhance learning are rewards and markers as indicators of progress (such as points, badges, scores, comparisons with peers, with shared listings of results). At iMEdTrust we consider such external symbols of “achievement” to be at risk of being counter-productive. We may test and use some point systems at times, for personal record keeping, but not for competition. Our interest is in helping learners find and develop their intrinsic sources of motivation, their personal goals and passions, their self-determination.

  There are, however, appealing characteristics of successful games that we feel are relevant to the learning environment we intend to cultivate. They are:

    - an overall sense of player (learner) control, although there may be short-term surprises and setbacks at times
    - clear, prompt feedback (awareness of outcomes of decisions and other actions)
    - a need for initiative and problem solving

- adjustable levels of challenge (difficulty) so that they can be adapted appropriately to the prior achievements and current readiness of individual players (learners), as well as to their preferences, so that they can feel as daunted as they choose, but also feel they are facing tasks that are achievable (the experience can be kept within each learner's eustress level)
- experiences may be scaffolded, so that appropriate levels of support are available as the levels of challenge increases, and according to the learner's current need
- in some games, there is an expectation for collaborative (team-based) decision-making.

In addition, well-designed games, like well-designed education, reward the players and learners with a sense of mastery of a set of tasks that they regard as worthy. Some games also succeed in filling the common human need for social connections with others who have similar interests. Unlike some games, we won't be fostering competition with others. Rather, in parallel with the needs of contemporary healthcare, we will foster collaboration as an avenue toward successful outcomes.

- General Practice: (GPs; General Practitioners): (See Primary Care and Family Medicine)

- Global Health: iMEdTrust's students will be drawn from many parts of the global community. The 21st century doctors we will be educating will need to understand and practice in the context of global health. Global health is considered the area of study, research and practice that that focuses on improving health and achieving equity in health for all people worldwide. Many health problems now transcend national borders and can have global economic and political implications, sometimes impacting highly local situations. With our intention of educating doctors who have the potential for becoming local and regional leaders in education and healthcare, in many disparate contexts, we will be providing experiences for our students in a variety of settings beyond their original home base. Global health is regarded as separate from international health, which is defined as the branch of public health focusing on developing nations and foreign aid efforts by industrialized countries. The predominant agency associated with global health (and international health) is the World Health Organization (WHO). Other important agencies impacting global health include UNICEF, World Food Programme, and the World Bank. The United Nations has also played a part with their declaration of the Millennium Development Goals.

- Global North: definition to be added

- Global South: definition to be added

- GMC (General Medical Council): The GMC is the UK's regulator of doctors and of the medical schools and postgraduate programs where they are educated. The following is from the GMC's web site: "We help to protect patients and improve medical education and

practice in the UK by setting standards for students and doctors. We support them in achieving and exceeding those standards, and take action when they are not met." The GMC is an independent organization. They set the standards that doctors need to follow, and make sure that doctors continue to meet these standards throughout their careers. To test whether or not medical schools meet their standards for educating the doctors who are wanted, they carry out monitoring and inspections, including talking to medical students about their experiences, and responding directly to any concerns raised. The GMC makes their standards available in several publications, including the online, downloadable PDF booklet, Tomorrow's Doctors.

- **GP Clinics:** We will have 2 main sets of General Practice (Primary Care) clinical learning facilities: those that are 1) standard NHS sites where our students will undertake a large part of their real-world clinical learning, and 2) our Model Clinics. The latter will be similar to standard NHS clinics, but will have some custom architectural and organizational features that will enable our intensive use of those sites for education and for support of our ongoing educational research. The pace of patient care in our Model Clinics will be adjustable, allowing for the extra time needed by beginners and for the kinds of supervisory interactions we desire, some of which will include the participation of patients who volunteer to contribute to the learning process. When fully informed patients give their consent, our students' clinical interactions will be video-recorded for the support of learning and, with techniques that anonymize personal identities, will contribute to our ongoing research programs.
- **Grades (Grading):** These are the symbols that are conventionally assigned as part of an effort to provide a summary description of learners' performance on examinations, in clinical rotations, or during other components of educational programs. Grades usually take the form of a number (93, 84, 67), a letter (A, C, F), or a word (Honors, Satisfactory, Fail). Inescapably, grades are serious over-simplifications of multiple, complex factors and capabilities. A symbol or a word can't provide enough information to guide future planning of learning. And, grades tend to arrive far too late to be of any help during the program to which they apply. Grades also also tend to reward some parts of learners' performance (often, short-term memory, perhaps an extrovert personality, or verbal facility) to the exclusion of other parts of competence (judgment, communication skills, perception, and much more) that may be more important for the students' future learning and careers.

  Quite often, grades are based on observations made by clinical supervisors who have had limited exposure to the learners' performance and who have had little if any preparation for making the decisions that are expected of them as assigners of grades. All of which is to say that we consider grades to have little if any constructive educational value and we will not be assigning conventional grades to our students' performance. Instead, we will have systems in place that will provide students and their educators with continuous access to rich data about the extent of each learner's progress toward the expected and desired learning outcomes. This level of comprehensive, timely information

is the foundation of well-implemented formative assessment and of our Adaptive Medical Education curriculum.

- **Graduate-entry Medical Education:** In the UK and in some other countries, most medical schools accept most entrants directly after they complete their secondary ("high school") education. In the US and Canada, as well as in some other countries, most medical schools are "graduate-entry". This is, they require most of their candidates to have completed a four-year college program. For iMEdTrust's "pathfinder" medical school we are expecting most candidates to have completed college or to have had equivalent work and life experiences. Our focus is not on the accumulation of course credits or grades but on opportunities for some time for personal maturation and for relevant life experiences, in preparation for our educational expectations. We want our medical students to work directly with patients from their first days with us and are persuaded that some additional living, on average, helps candidates be equipped for the challenges they will face. For the same reasons, we will seek to have our Partner Medical Schools in low-resource countries adopt the same policy, but we will also be respectful of constraints that may derive from local conditions and cultural patterns. We will be prepared to adapt as needed.
- **Ground Rules:** This is a metaphor, adopted from sports, that is used in education to indicate that group learning events proceed best when all participants know and adhere to a set of "rules" (i.e., guidelines) for personal conduct and interactions. For example, during a debriefing, after a group engages in a simulation exercise that was video recorded and is being reviewed, the "ground rules" might include such behavioural agreements as:
    - The student who is the centre of focus in the recording has primary control over stopping and starting the playback of the recording, although others can request a pause and raise a question about a specific moment in the event if the main student hasn't chosen to pause at that point;
    - The observers are encouraged to ask questions but to avoid judgmental comments;
    - The focused-upon student is encouraged to identify moments that she/he regards as an example of something that went well and why, and any moments that were sub-optimal, and why;
    - If a group member perceives a problem that could have been avoided, which isn't recognized by the primary learner, that problem is to be introduced with one or more questions, as needed, to guide the learner toward recognizing and reflecting on that issue (not by making accusatory or judgmental comments).
- **Group-mates:** In the iMEdTrust context this refers to the other members of the various types of learning groups to which our students will belong: those in their Collaborative Learning Groups, in their Simulation Centre team-process learning groups, in their team learning groups in the GP clinics, those in the research teams they join, as well as those in informal study groups, which we anticipate they will form in their residence halls. (These groups are brought to life in our 2 Student Stories, to which links will be available later.)

- **Habits:** (including “habits of mind” or “mindsets”): Habits are both vital to effective human functioning and potential sources of limitations and problems. We depend on habits of performance to become successful in building complex abilities. (Think of the slow accretion of habits that enable us to go from needing total concentration when we begin learning to drive a car adequately to becoming able to drive safely and well while also talking with a passenger and more.) For more about habits in performance, see procedural learning.

  Habits of mind, however, operate differently. Unless we are carefully and accurately aware of any routine ways of thinking we are acquiring, we may be at risk of limiting our capacities to continue learning in those areas. We can become closed to fresh perspectives, even dismissive of alternative points of view. Deeply established habits of mind can be at the heart of bigotry and other forms of prejudice. At iMEdTrust we are persuaded that educators need to understand the risks and outcomes of habits of mind (that is, our hidden assumptions). Such habits are sufficiently counter to effective clinical and scientific work that we will be giving the topic substantial attention. We want to ensure that our faculty and students are or become accurately reflective about the ways they use, and the ways in which they may be constrained by, habits of mind that are relevant to their work as clinicians, scientists, and educators.

- **Health Professions Education Research Institute:** This is a core component of iMEdTrust’s mission and program. The staff and collaborators associated with this Institute will continuously study and support our educational program, as well as share data and insights from our experiences for appraisal and use by others. Members of the Institute will also cultivate and join multi-institutional and international collaborative research groups as active, contributing partners. The Institute will have full-time and part-time groups of faculty members who, together will have the experiences and resources for making significant contributions to the advancement of basic scholarship in health professions education, as well as provide practical guidance for day-to-day educational decision-making by us, our Network partners, and others. The responsibilities of the Institute will include quality assurance of our educational programs, basic and design-based research, and educational think-tank activities.

- **Hidden Curriculum:** At least since the 1960s, thanks to the writing of Paulo Freire, attention has been drawn to the possibility of schools having two curricula, the planned and publicly described curriculum, and a second, alternative curriculum, which may be unplanned and institutionally unintended, or there may be a surreptitious (unacknowledged but willfully imposed) curriculum. Since the distant past some programs in some schools have been used by influential groups in society as instruments to maintain aspects of their preferred social system. In recent decades, in medical and other educational domains, research has revealed that educational programs can exert strong but unrecognized (or unacknowledged) influences on learners, producing unintended (or unannounced) outcomes. At times, as has been documented, some of these unexpected outcomes are the reverse of what was intended by the curriculum designers. For example, a medical

school's curriculum planners may want to promote an enlarged interest in having their students pursue a career in general practice (primary care). But, unrequested, some of the sub-specialist role models to whom the students are exposed during their clinical experiences may be disparaging toward GP careers, contributing to some students avoiding that choice. Such contrary, unintended influences, which aren't rare, have come to be regarded as examples of the "hidden curriculum". Our EDP (Educator Development Program) is partly motivated by our determination to avoid having competing messages within the curriculum, which may result in undesired outcomes.

- **High-Stakes Assessments/Examinations:** (see, also, Summative Assessments and Summative Decisions): Among the most widely and strongly held assumptions in education at all levels, worldwide, is a belief in the appropriateness and value of "final" examinations. We are challenging those assumptions. This is not the place to make the full case regarding the weaknesses of the arguments offered in support of this assessment tradition. For now, we offer the notion that high-stakes testing, by definition, is a huge and potentially misleading compromise. Largely, such testing has flourished in the presumed absence of a better alternative.

  Many authorities now recognize that the one-time snapshot of a learner's capabilities (in medicine), typically under artificial time constraints, focused on only a small sampling of the wide-ranging, complex capabilities needed by clinicians, is scientifically indefensible. High on the list of our major goals for iMEdTrust is the development, study and anticipated validation of the proposition that we now have the tools and techniques for doing a far better job than is possible with high-stakes testing.

  Our AMEMS, in addition to orchestrating and providing many of the pieces that support our students' learning, will be gathering continuous, authentic, valid and reliable information that enables far more fully informed and dependable judgments to be made about our learners' experiences, capabilities and potential than can be gathered with high-stakes assessments.

  Sometimes lost in the process of taking the need for final examinations for granted is the question: Why are these exams being used in the first place? A frequent response is that the exams are filters; they determine who has successfully "learned" the material of the preceding course, rotations, or year. The information gathered from such tests, ultimately is for arriving at summative decisions**.** These decisions are important and deserve the highest possible quality of information. There are far better sources of such information available than can be gathered through high-stakes tests.

- **Humility:** Although "humility" is not typically a word that shows up in educational discourse, we include it here out of conviction of its importance to the kind of educational culture we believe is desirable and that we are seeking for our iMEdTrust programs. We are persuaded that medical students tend to treat others in the ways that they are repeatedly treated by those who are influential in their lives. We are setting out to have our faculty members be role models of being open to the views and perspectives of others, of being respectful toward attitudes, beliefs, and conclusions other than their own. We want our

students' experiences to be free of the sort of arrogance that manifests in uncompromising, assertive posturing (which some of us have experienced from some of our former teachers). We want educators with whom learners feel safe, and who they feel free to question, even challenge, at times. We want educator-learner and provider-patient relationships based on a level of trust and human equality that don't usually emerge in the absence of the kind of quietly self-confident humility we are seeking. We need to emphasize that we are not looking for educators who are meek or diffident, or incapable of being assertive, when needed in defense of important values or principles. We do want an absence of vanity and inflated self-importance. We want authorities who are not authoritarian.

- **Humor:** (in education): You may wonder: Why is a definition of humor included in a serious discussion of medical education? Humor is not only for entertainment and distraction. Effectively used humor can reduce the distance between authority figures (as teachers and doctors are often seen as being), and those they are seeking to serve. People who share a laugh, by definition, have something in common. If they've shared something pleasant, barriers can be reduced and a sense of connection can emerge. The right kind of humor can help a distant figure appear friendly and approachable, creating the environment needed if students are to feel safe revealing their uncertainties, worries and need for help.

Even technology, such as Apple's Siri voice response system, have been found to be trusted more by people if they have a sense of humor, not just an ability to answer questions correctly. What kind of humor is appropriate in teaching? Humor can take many forms. Although a good deal of humor in popular culture depends on sarcasm, ridicule, humiliation, or insults, there is a large body of humor that is gentle, kind, even uplifting. Some comedians, politicians, educators and others have learned an important lesson: the form of humor most likely to reduce the distance between people, to remove obstacles, is gently self-deprecating humor, such as:

- "Why should I be the only one in our group who doesn't know the answer to that question?"
- "Oh, you think your memory isn't all it should be? Wait until you get to be my age."

Like all communication, the words in those examples can be quite effective, or they can backfire, depending on how they are delivered: whether mechanically or comfortably; with a dour expression or with a smile. Educators who have difficulty relaxing, being warm and genuine, are unlikely to be helped by telling jokes or by introducing other forms of humor.

- **iMEdTrust:** (international Medical Education Trust)**:** This is the umbrella entity that embraces the entire set of initiatives we are pursuing as parts of our charitable mission. iMEdTrust is a registered charity in England and Wales, and is ultimately responsible for all of the activities, missions, and goals described in the overall document of which this Dictionary is a section. Like all other "charities" in England and Wales, we are monitored by the Charities Commission and are being held accountable to remain true to our stated

missions. In addition, we are in the process of working to become a free-standing university in England, monitored by the Quality Assurance Agency (QAA). And, as a medical school within that university, we will be monitored by the General Medical Council.

- **iMEdTrust's Pathfinder Campus:** (see, iNSoMed) This refers to the site where we are pursuing the specific combination of educational and residential arrangements we are designing and will be continuously studying in our effort to devise plans for maximizing learning effectiveness and minimizing the costs of medical education. The initial lessons learned from our "pathfinder" campus will guide the designs, scaling and adaptations that will be optimally appropriate for each of our separate Partner Medical Schools in a variety of cultural, economic, and historical contexts in multiple low and medium income settings.

To the maximum extent feasible, all elements of each of our campuses will be contiguous, to minimize the difficulty, time and cost of access and movement for students and faculty. Proximity will be important in the context of the immersive experience of getting a high quality medical education. We consider it important that students have easy access to the members of the small groups they will join, both during the regular curriculum and spontaneously during personal time. Our attention to proximity between the residence halls and our regular learning spaces, as well as our provision of comfortable small group meeting spaces in the residences, will enable a variety of spontaneous learning and collaboration opportunities.

Our integration of our learning and residency spaces will serve another set of important purposes. All or nearly all of the students attending our pathfinder medical school will be from other parts of the world. Unlike international students who go overseas for education, and hope to settle in the country where they are learning, our and our students' intentions is for them to return to and serve people in their home country.

Part of our strategy is to ensure that our students remain fully, emotionally linked to their roots. This will be fostered in several ways, including:

- having the students rotate back to their home setting intermittently for some of their clinical and research experiences,
- having mentors in their home setting with whom they maintain regular contact via electronic resources we provide,
- working with patients from their own country even while away from home, and more.

In addition, the design of our residential and learning facilities will support what people away from home almost always do anyway: that is, they choose to form clusters with each other. Our student selection arrangements will ensure that we always have a fairly continuous flow of multiple students from the same locale, even though they enroll at different times. These students will live in close proximity to each other on campus, and will be encouraged to extend our collaborative, educational culture to include being engaged with and supportive of each other. There is no intent for them to assimilate into the community in which they are currently learning.

- **iMEdTrust University:** This is the administrative entity that will be responsible for the entire set of activities being pursued as part of our charitable mission. It will be responsible for the initial medical school (iNSoMed), in London, and subsequently for the growing number of networked campuses in various resource-limited locations, globally. Becoming eligible to be a university in England currently requires (among other considerations) the enrollment of a total of at least 1,000 students. We expect this to require at least 8 years, during our intentionally gradual build-up of our student population.
- **Individualized Learning:** This is the essence of Adaptive Medical Education (AME). It is the set of strategies and principles that derive from recognizing that each person is unique, just as we do in patient care in clinical practice. The commitment to respect learner diversity and the need to provide individualized learning are not just reflections of a belief system or an effort to be generous. These principles derive from strong and continuously growing educational, psychological and brain sciences. Each of us has a genuinely unique set of brain maps and emotional, cultural, and personal histories that shape our perceptions, learning capacities and the lasting effects of new experiences.
- **Industrial Model (of Education):** Many of our current traditions in education derive from attitudes and practices that evolved during the industrial revolution. Many of the practices in conventional, standardized medical education can be understood as reflections of the assembly-line approach to industrial manufacturing. There are many curricula in the world's medical schools that have the characteristics of the industrial process. Those schools can be thought of as having operating approaches that are rough approximations of traditional automobile factories. They decide in advance how long the full process will take from start to finish, (whether 3, 4, 5, or 6 years), and they expect that schedule to apply to all of their graduates (products). They have a predetermined schedule for when each course/clinical rotation (component part) will be added in the process of assembling the final product, and how long each of these additions will take to complete. Then, they check on their work with a largely impersonal, old-fashioned "quality control" mechanism in the form of a set of "final tests", sometimes conducted by "external examiners" who have little or no knowledge of the origins, pace of change, special challenges or unusual talents of the person (product) they are assessing. Some day these practices will likely be regarded with disbelief. For now, for a proportion of the world's medical students, this is an all-too-accurate summary of aspects of the process they experience.
- **iNSoMed:** (International New School of Medicine) This is the name of the "pathfinder" medical school that will be the first major component of iMEdTrust. This will be the institution where we develop and refine our initial and evolving ideas, which we will carefully and continuously study. All aspects of this initial medical school will be under scrutiny for lessons that can help inform the design and adaptation of our Partner Medical Schools and other educational programs in low-resource countries and settings.
- **Institutional (Organizational) Culture:** (See, also, Culture) One of our guiding principles is an emphasis on the importance of institutional culture. In the educational context this includes the collective values, beliefs and principles held and supported by members of an

organization. Culture includes the organization's members' shared vision, values, norms, systems, symbols, language, assumptions, beliefs, and habits. Organizational cultures influence what happens day to day in the process of making small and large decisions. It includes the pattern of behaviours and assumptions that are conveyed to new organizational members, which can come to influence their ways of perceiving and, even, thinking and feeling. Thus, organizational culture affects the way people and groups interact with each other, with those they serve, and with external colleagues, collaborators, and supporters. Organizational culture may affect how much members feel a sense of identification with that organization. In large organizations conflicting subcultures may co-exist, as they do in those educational institutions that have been found to have a hidden curriculum.

At iMEdTrust we consider cultures to be central determinants of the quality and effectiveness of education programs. So, we will devote substantial effort to assuring that all of the faculty and students have a clear understanding of, and commitment to, the goals, premises, values and priorities of our program. In other words, we will seek to have an explicit, clearly defined, communicated, shared and consistently supported educational culture. Most elements of that culture are reflected in our curriculum description and in this Dictionary.

- **Intellectual Property:** (see IP)

- **Interactive Learning:** Interactive Learning can have a variety of meanings. The phrase often implies a set of planned educational approaches that have in common a continuing set of exchanges between the learner(s) and one or more types of instructional resources. These resources may be:
    - one or more live educators
    - a specially programmed digitally-based experience (such as our AMEMS)
    - a systematic engagement with other learners through the use of online social media
    - engagement with a simulated patient or with a programmed mannequin
    - some combination of these and additional resources.

  Although progressive educators at least as far back as Socrates have been highly interactive in their approaches to education, the main recent growth and spread of this form of education delivery has been since about the year 2000. This was approximately when students who were digital natives began arriving in higher education programs. The use of interactive technologies and approaches in learning for these and subsequent waves of students is as natural as using pencils, paper and handwriting were to prior generations. These learners increasingly conveyed their expectations that their learning experiences should be interactive, in contrast to the long tradition of having much of higher education organized around one-way communication from lecturers to a mainly silent audience.

  Of course, the lecturing legacy remains strong in many medical schools, especially in the early years of traditional programs. For many established medical educators, the arrival of

the expectation of interactive learning has meant the need for a significant role change: transitioning from seeing themselves as the keepers and disseminators of knowledge to needing to learn how to be effective facilitators of learning. The demands involved in making this shift successfully can present a serious challenge for some educators. At iMEdTrust we will be seeking to recruit educators who have successfully made this transition. In addition, we expect that some of our recruits may need help in consolidating and reinforcing that transition, which we intend to provide as part of our Educator Development Program (EDP).

- International Health: (See Global Health)

- International New School of Medicine (see iNSoMed)

- Inter-Professional Education: (also written as "Interprofessional Education", or "IPE"): This refers to learning events in which students from two or more of the health professions participate together during some or much of their professional education. These shared learning experiences are usually meant to achieve one or more of the following goals:

- enhancing understandings of and respect for the perspectives and range of skills that each professional group can contribute to the healthcare process
- preparation for working in collaborative teams during healthcare practice
- gaining the skills of being effective team members, in which leadership is shared and rotates according to areas of competence, not age, gender, professional identity, of other hierarchical symbols.

Effective care of many of the patients seen in primary care settings requires teamwork among multiple health professionals, drawn as needed from among doctors, nurses, social workers, dieticians, physical therapists, psychologists, and others. Such teamwork requires deliberate practice. Putting students from different professions in the same room to jointly hear the same lecture is not our idea of inter-professional education and will not be part of the iMEdTrust program.

- Inter-professional Health Teams: to be added

- IP (Intellectual Property): This is, essentially, a legal notion, although it is also used informally. It refers to a variety of types of creations by people. IP can include artistic works, discoveries and inventions, various types of writing, designs, and more. Under IP laws, owners of intellectual property are granted certain exclusive rights. Some common types of IP rights are copyrights, patents, and trademarks. As part of iMEdTrust's mission we intend to share our IP rights to the approaches, materials and processes we develop through one or more of the Creative Commons-type copyrights. We expect that most of our creations will be shared with little or no cost to Partner Medical Schools in low-resource settings, and at reduced cost with other non-profit educational programs.

- Large-group Learning: As indicated in the entry on small-group learning, there isn't a fixed number that defines a "small" group. In general, educationally, a group can be considered "large" when there are more people present than can enable everyone to have an equal and reasonably regular opportunity to contribute to verbal exchanges and to hear

everyone else. Traditionally, in large groups, this is not a consideration. There, typically, the focus is mostly on the presenter(s), with little effort to provide opportunities for the overt participation by the others in the room.

In some programs, where existing large meeting spaces continue to be used, there are now some educators who have been developing approaches toward reducing the educational limitations of the large-group setting. They may have adjacent people (pairs, triplets, quartets) interact in various ways, such as coming up with a group-based solution to a problem. Or they may use one of the available variations of a "lecture response system", in which a dedicated device (sometimes called a "clicker"), or an app on a smartphone, which enables individual students to respond to multiple-choice-type questions. These answers are usually collected anonymously, so that grouped results are displayed, with no identities revealed. Although these and other techniques move the students' learning experiences toward the more active and meaningful end of the passive⇔active continuum, they are compromises. None of these approaches approximate the personalization that is possible in small groups, in mentoring, or in a fully realized Adaptive Medical Education program, such as we are developing.

- **Lasting Learning:** There have been many encouraging signs in the evolution of medical education in recent years. Among them has been the growing recognition of the difference between short-term recall and lasting learning. Short-term recall is mostly what is demonstrated by student performance on traditional high-stakes tests. There is now a growing search for ways to ensure and demonstrate that learning is sustained and available for appropriate use well after conclusion of any given course of study.

  Meaningful learning needs to be available in the clinical or research work for which students are preparing. We now understand that achieving lasting learning demands conditions and arrangements that are quite different from our legacy approaches to both instruction and assessment. That transformation, and the conditions needed for moving toward its full realization, is part of our core intensions in designing and offering the iMEdTrust educational program.

  Among the insufficiently used learning strategies for achieving lasting learning in medical education, which we regard as key features of iMEdTrust's programs, are: deliberate practice, reflection, continuous formative assessment, encouragement of self-assessment, constructive feedback on the accuracy of the learners' self-assessments, as well as a high focus on the quality and characteristics of personal relationships, including emotional and social intelligence. In addition, we will ensure that all educators are highly prepared for the specialized demands of being effective in supporting other peoples' learning, which will be continuously emphasized through our Educator Development Program (EDP).

- **Leadership:** In our organizations and for those we intend to help prepare as future leaders, we consider leadership to be derived from two groups of factors:

    - possession of the personal characteristics and capabilities (character) needed for providing leadership, including high levels of relationship and

communication skills, well-developed emotional and social intelligence, and the capacity to earn and sustain the trust of others
- competence (discerning and managing the strateg needed) in the area/domain in which leadership is being exercised.

Leadership, as we see it, for the operation of iMEdTrust's programs, is an earned position. It does not derive from age, titles or hierarchical structures.

- **Learner Competence:** A learner's level of demonstrable capability in defined areas of knowledge (information and understandings), skills, and attitudes, in contexts relevant to the domain(s) under consideration.
- **Learner Diversity:** To be added
- **Learning Experiences (LEs):** LEs are specific learning events, such as simulation exercises that are focused on, say, beginning to develop the skills and understandings needed for listening to and interpreting a patient's breath sounds. Groups of learning experiences, cumulatively, support the eventual mastery of a set of desired, related enabling outcomes. The intentions of most LEs involve the fulfilment of steps toward achieving defined milestones (thresholds) that accumulate toward the eventual fulfilment of the program's required and desired ultimate outcomes.
- **Learning Goals (see Learning Outcomes)**
- **Learning Journals:** (learning logs) – to be added
- **Learning Logs:** – to be added
- **Learning Modules:** The collection of learning experiences undertaken by learners during a term (typically, 14 weeks). Together, these learning experiences support the development of desired threshold capabilities, which, together with other experiences build toward the program's required and desired learning outcomes.
- **Learning Needs:** These needs are the difference between a learner's current capability level(s) and the level(s) expected for fulfilling the outcomes specified for the area(s) under consideration.
- **Learning Outcomes:** See Outcomes (of learning)
- **Learning Pathways:** The sequence of experiences in which an individual learner engages over time. These pathways are dynamic, responding to accumulating information from many sources that guide the learners' choices and their advisors' recommendations. Initial pathways are planned on the basis of information gathered during the Diagnostic Workup we will do as a central feature of our student application and selection processes. The planned pathways will then remain under continuous review as additional information is accumulated.
- **Learning Resources:** The iMEdTrust program is composed of learning modules (groups of Learning Experiences that, together, lead to mastery of a set of desired, related outcomes). Learning Experiences are specific learning events, such as a Collaborative Learning Group meeting that is focused on, say, an orientation to using the iMEdTrust

Adaptive Medical Education Management System (AMEMS). Learning Experiences, such as in this example, serve to support the pursuit of enabling outcomes, which are part of building the foundation needed for achieving the broader goals of reaching the ultimate learning outcomes needed for graduation.

- **Learning Sequence(s):** See Learning Pathways.
- **Learning Tasks:** definition to be added
- **Legacy:** In medicine and in medical education we have many practices, assumptions, and beliefs that are our legacies; that is, residuals we've inherited from the past. Although some of those influences on our current approaches continue to be appropriate, as confirmed by ongoing research, too many of them survive only because of our human inclination to find comfort in the familiar and our common tendency to resist change (even when it is demonstrably needed). These characteristics of resisting change had survival value for hundreds of thousands of years when our distant ancestors recognized that learning and sustaining old lessons could make the difference between finding a meal and becoming a meal. But these characteristics have lost their relevance for our current, rapidly evolving world.

  Too many medical teachers and administrators still do little to promote or support constructive reform. Those of us who recognize the vital importance of being more adaptive to changing circumstances need to do what we can to devise and study models of adaptations to our changing technologies, economic circumstances, scientific findings, as well as our evolving population and community needs. We can no longer justify automatically preserving our legacies for their own sake, without being carefully discriminating in our choices.
- **Lifelong Learners**: to be added
- **Long-term Memory:** (see, also, Lasting learning): Good psychological and brain research, dating back at least to the middle of the 20th century, has confirmed that remembering (learning) is a multi-stage process, requiring explicit conditions. Regrettably, many of our inherited medical education traditions were developed without the benefit of access to the findings of the sciences we now have available. Many of the intuition-based decisions that guided the formulation of our traditions resulted in practices that don't support lasting, usable memory (learning). We now recognize that many of those intuitively devised strategies actually interfere with establishing and sustaining long-term memory. Our concern with that situation derives from the fact that a good many of those inappropriate practices continue in many of the world's medical schools and are defended on the assumption that if they've been around for so long, they must be appropriate. At iMEdTrust that argument will not be considered relevant or worthy.
- **Maintenance of Competence: (MOC)** (or, Maintenance of Certification): These are relatively recent efforts in Canada and the US to find ways to encourage and confirm that specialist physicians are remaining current and competent in their fields of work. As explained in this article, and here, these processes are controversial. For now, these approaches are rather incomplete as educational and as assessment strategies. Since

they are not directly related to doctors outside of North America, and they are not focused on pre-graduation students (our main focus here), we are not giving these initiatives any additional attention at this time.

- **Mannequins:** (Manikins**):** Although these terms are used in other contexts (such as referring to the life-size dolls used by artists, tailors, and shop-window-display dressers) our use is related to various representations of complete or partial human forms for support of simulation-based learning, mainly for health professionals. Mannequins, as part of simulation-based learning, are also widely used in related educational programs (e.g., for the preparation of various emergency rescue personnel).

  In recent years, mannequins have become increasingly sophisticated, and they continue to evolve. They are now in growing use as parts of health professions education at all levels, from introductory experiences for beginners, to highly elaborate, hyper-realistic experiences for sub-specialized post-graduate learning. Mannequins range from being inert forms to computer-controlled, multi-level replications of many aspects of human anatomy, physiology and other biological systems. Mannequins are now used for the learning of various clinical skills and procedures, decision-making and other cognitive tasks, and for some parts of the communication process. Simulations, in general, and mannequins, in particular, can range from being "low fidelity" to "high fidelity", meaning they range along the full continuum from having barely-any-resemblance to being largely-indistinguishable-from the human processes they are representing.

- **Mastery Learning:** Building on, and going beyond the thinking and work of others, in 1968, Benjamin Bloom of the University of Chicago began defining an approach to education he called Learning for Mastery, which has come to be called Mastery Learning. Although Bloom's focus was on children and school learning, as well as mainly on informational learning, some of us who were exposed to those ideas at that time were persuaded that there were seminal implications for medical education. Those implications are still a long way from widespread implementation in medicine. At iMEdTrust we have concluded that many of those ideas remain highly relevant and consider our development of Adaptive Medical Education to be founded on several of the notions underlying Mastery Learning, most especially:

    - the recognition of differences among learners in their readiness for what the program expects at any given time
    - acceptance of the principle that different learners need different amounts of time to reach "mastery"
    - the desirability of having learning experiences organized in ordered, sequential steps, with mastery at early steps being prerequisite for advancement to subsequent steps
    - the design of learning experiences so that they engage learners in multiple instructional methods, learning levels and multiple cognitive thinking types

- the attitude that those responsible for the educational program should take responsibility for some or most of whatever difficulties students may have in making progress
- the importance of carefully defining the specific indications of successful mastery, in terms of both intermediate ("threshold") outcomes, as well as the program's ultimate, expected outcomes.

- Mature Learners: For the purposes of the iMEdTrust educational programs, we consider mature learners to be those who:

- are eager, curious and self-directed
- take ownership of their process
- have, or are on their way to having, a fairly clear, although continuously evolving, sense of their career goals, their areas of primary and secondary interest, their life priorities and values
- are prepared to work hard toward achieving their goals
- are reflective, and continuously self-assessing
- welcome constructive guidance from those they respect and trust (educators, peers, patients, others).

We consider such characteristics, even in their early stages of development, to be important criteria during candidate selection for admission to our programs, and we are determined to avoid any educational practices that might interfere with the continuing development, reinforcement and refinement of these foundational elements of a lifetime of learning, which, in turn, is vital for safe clinical practice throughout a clinical career.

Mature learners could be a challenge for faculty members who, in the conventional mold, take control of the focus and the process of educational events. Such faculty members might not welcome the sorts of questions that mature learners may ask, as, for example: How does what you are expecting us to care about fit in with the program's required outcomes, or with my career goals?

Any of us who find that some learners don't understand how our intentions are relevant may need to make some adjustments. We may need to help the learners reexamine and possibly modify their goals so that they are a better match with the outcomes the regulators and the school require, or we may need to consider revising what we are expecting, or we may need to work at conveying a clearer, persuasive sense of the rationale for our expectations.

Conventional educational programs have shaped many learners into being passive and "immature"; that is, "learners" who see their central task as:

- following orders
- doing whatever their teachers expect, so that they will receive "passing" grades
- accepting that their responsibility is to please their teachers, so that they can complete their educational program, not to feel that their education is more than a stepping stone.

Mature learners, by contrast, recognize that their careers begin the moment they start preparing to apply to medical school (or to the education program for whatever career they have chosen). They formulate plans that include pursuing experiences that can help them refine or modify their career decisions, but they are careful about how they use their time and energies, seeking to stay focused on their career goals to the maximum extent possible.

- **MBBS Degree:** The Bachelor of Medicine, Bachelor of Surgery degree (technically, two degrees, typically awarded together) that is most commonly awarded to graduates of medical schools in the UK and in countries that follow the UK tradition. This degree may be abbreviated in several ways, such as: MBBS, MBChB, MB BS, MB BChir, BM BCh, MB BCh, MB ChB, BM BS.) Although the designation "bachelor" suggests a first graduate (post-high school) degree, the same degree is also awarded at UK graduate-entry medical schools, as our London-based school will be. In countries that follow the US tradition, the equivalent medical degree is awarded as Doctor of Medicine (MD), which is considered a professional doctorate degree. MBBS awardees in the UK can earn an MD degree by conducting and publishing an approved research project after graduation.
- **Mental Rehearsal:** This phrase is used in several domains, with somewhat different implications. For our purposes, in education, much as it is used in sports, we are referring to the use of mental imagery as a way of anticipating and practicing a set of actions or processes in one's mind. In education, as in sports, mental rehearsal can be a valuable part of learning new skills, practicing and refining existing skills, preparing for using a set of skills, and enhancing motivation. Mental rehearsal can be seen as a component of "reflection-before-action". This process is sometimes referred to as mental practice. In several sports, properly done mental rehearsal has been confirmed to bring as much improvement in performance as real practice, providing that the learner has first gained some experience engaging in the actual sport itself.
- **Mentoring (Mentors; Mentorship):** Mentoring is a key element of our iMEdTrust educational programs. Our approach to implementing this process involves having mentors who systematically apply a high level of skills and understandings to the mentoring process. Mentoring is a set of activities in which one person provides guidance, support, and alternative perspectives within an extended, supportive relationship with another person. Although this relationship is most frequently between a faculty member and a student, it can be between any two people, and the help can flow in either direction at various times. The help is most often in relation to Learning Experiences in which the "mentee" is currently engaged, but it can include considerations related to a person's other current activities and anticipated experiences, in their career or personal life. Although mentoring is typically conducted face-to-face, especially in the early phase, it can shift to other forms of communication (written or spoken exchanges from a distance), once a relationship and trust have been well established. (For some glimpses of a mentorship relationship in action, please see Student Story #1, which will be available soon.)
- **Memorization:** (Memory)

- **Milestones:** In the US, the Accreditation Council for Graduate Medical Education (ACGME) has been initiating an enhanced approach to accrediting residency education programs. In the process, they are bringing attention to the notion of "milestones" in learning. The term has been used for many years in reference to young children, with a focus on "developmental milestones". As defined by the ACGME, in the context of specialty-focused medical and surgical education, (and as modified slightly by us): Milestones are significant points in professional development. For accreditation purposes, the milestones are competency-based developmental outcomes (i.e., knowledge, skills, attitudes, and performance) that can be demonstrated progressively by residents and fellows from the beginning of their post-medical school education through to the point of qualifying for graduation and for unsupervised practice of their specialties. We find the concept of milestones a useful shorthand for "intermediary or enabling outcomes" (that is, steps along the way toward the end-of-program outcomes our program is designed to help students reach). Milestones can also be thought of as the equivalent of "threshold capabilities", as used by the UK's Quality Assurance Agency (QAA), and, because of the latter, by us at iMEdTrust.
- **Mindful:** (in education, in clinical practice): In the context of iMEdTrust's approaches to preparing health professionals, we are focusing on a subset of the implications of being mindful. First, we need to emphasize that our focus is related to, but is not the same as mindfulness or situation awareness, both of which are highly important but somewhat different from what we are implying in giving attention to "being mindful". As clarified by Ronald Epstein, mindful practice is the moment-to-moment, nonjudgmental attentiveness to one's own thoughts, feelings, and experiences during everyday practice, to promote clarity, insight, and effectiveness. Systematic research indicates that being mindful can contribute to more accurate clinical diagnoses, better care of patients, and greater patient safety.

  Here, we are emphasizing that when we are mindful as educators, learners and clinicians we are achieving a high level of awareness of whatever is happening that might be relevant to our current intentions and activities. Being mindful is about observing oneself as well as the outside world: our patients, our students, others, and the processes in which we are engaged. It is more than thinking about our thinking, in the usual sense. It involves attention to our thoughts as well as to our bodily sensations and emotions. It is related to Donald Schon's notion of reflection-in-action, as explained in *The Reflective Practitioner*. But it is more than is usually implied by that phrase. As argued by authorities in the field, mindful practice in medicine also has a moral dimension, specifically, the intention toward compassion towards oneself and others. For our iMEdTrust educational program, we regard this latter dimension of mindful practice as being closely related to our notions of empathy and empathic communication.
- **Mindfulness:** Mindfulness refers to a state of mind, a psychological characteristic and a set of practices (including, but not limited to meditation) that help promote that state of mind. Physician scholars, such as Ronald Epstein, have studied the integration of

mindfulness in health care (medical practice) and have found that doctors who have learned to practice and regularly use mindfulness can enhance patient care and patient safety. Jon Kabat-Zinn developed the “Mindfulness-Based Stress Reduction” program at the University of Massachusetts. His and his colleagues’ research has demonstrated many positive outcomes for participants. The program has been widely influential and replicated internationally.

- **Mindsets:** This term can have somewhat different implications in different domains and contexts. In education, we use “mindsets” to imply a set of assumptions, expectations, and beliefs that are well established and that can have a considerable impact on a person’s approach to other people and to new ideas and experiences. Mindsets can help or hinder learning, performance, and personal growth.

  As clarified in the work and writing of Carol Dweck, a key difference between people is whether they have a “fixed” or “growth” mindset, and how firmly fixed their mindset is. People with fixed mindsets tend to be resistant to change, while those with growth mindsets are more inclined toward being open to learning, to other people who are different from themselves, and to benefitting from alternative perspectives. They are more willing and able to change how they think and what they do.

  Our candidate selection process will seek to identify which potential faculty members and students have a “growth” mindset, and our research programs will seek ways to improve our capacity for identifying such people as early as possible, and for helping support the continuous refinement of people’s growth mindset.

– **Mission:**

- **Model Clinics:** These specially-designed sites, for both clinical care and learning, will be part of our iMEdTrust’s facilities at our pathfinder campus in London (iNSoMed), and will operate as hybrid resources. That is, the model clinics will have regular NHS doctors and patients, just like the regular GP clinics in which our students will have many of their learning experiences. But they will be supported with additional resources from iMEdTrust, enabling the doctors to take more time with their patients than they normally can, when needed for educational purposes. Clinic doctors will also be able to spend extra supervisory time with our students, as needed. In addition, these clinical sites will be where our faculty will undertake and study innovative approaches to patient education, staff organization and communication patterns, as well as other aspects of the process of improving the patient care process.

- **Moulage:** is the art and the materials used in applying mock injuries and other surface signs of illness or damage to people for the purpose of providing Emergency Response Teams and other healthcare and military personnel with simulated practice in managing those injuries and findings. Moulage may be as simple as applying pre-made rubber or latex-based "wounds" to parts of a healthy "patient's" body (their limbs, chest, head, etc.), or as complex as using makeup and other theatre techniques to provide elements of greater realism (such as simulated blood, vomitus, even the appearance of open fractures, and more) to enhance learning experiences.

- **National Health Service (NHS) (England):** The NHS is the publicly funded healthcare system for England. It is the largest and the oldest single-payer healthcare system in the world. It is primarily funded through general taxation and provides healthcare to all legal residents in the United Kingdom, with most services free at the point of use. Some services, such as emergency treatment and treatment of infectious diseases are free for everyone, including visitors. Some NHS services require a financial contribution from the patient, such as eye tests, dental care, prescriptions, and aspects of long-term care. However, these charges are often free to vulnerable or low income groups, and when not free, are often lower than equivalent services provided by private health care providers.

  The NHS provides the majority of healthcare in England, including primary care, in-patient care, long-term healthcare, and more. Virtually all of the clinical learning of iMEdTrust's students while based in London will be in NHS-supported facilities, supervised by NHS-registered doctors or other health professionals. Most of these experiences will be in primary care (GP) ambulatory clinics, and some will be in inpatient rotations in NHS Foundation hospitals. Some student learning experiences will be in our model GP clinics, which will also be NHS-linked, in part, for the services provided to NHS-registered patients who receive care there.

- **Network:** to be added

- **Non-judgmental:**

- **Online Learning:** During the past decade or so there has been a rapid increase in offerings of post-secondary online learning, accelerated by large commercial entities promoting their Learning Management Systems (LMSs), and by highly publicized "MOOCS" (Massive Open Online Courses), many offered by high-prestige universities. In addition, a growing number of educational programs and organizations, as well as educationally-focused commercial entities are offering webinars.

  The LMSs are evolving rapidly, and are becoming well established. A rather wide variety of approaches are being pursued in the various institutions in which they are being used. MOOCs and webinars are still being sorted out. Many details have yet to be resolved for these offerings, such as: how much to charge, if anything; if and how to give course credit; how to set and maintain standards, and more. Some colleges and universities, including our iMEdTrust program, are supplementing, or preparing to supplement, their in-person learning experiences with some versions of online learning experiences. In our case, online learning opportunities will be important, both when students are at a distance from their home base, and on a daily basis while they are at their home campus. See the entry about our Adaptive Medical Education Management System (AMEMS).

- **Open Source:** **(**also see Creative-Commons**)**: Open source refers to a computer program in which the source code is made available for others to use and/or modify. The intention in providing open-source computer code is usually to promote a wider participation in the effort to continually improve the program or processes involved. The understanding is that the modified (improved) code will also be openly shared.

We draw attention to Open Source, partly, since at iMEdTrust we will be sharing components of our technological developments with others as part of our philanthropic mission. Mostly, the code and other technology-related processes we share will be done under the Creative-Commons licensing program, which is non-commercial and open, but may carry some restrictions. Partly, we also refer to Open Source as a metaphor for our attitude toward sharing our non-technology-based contributions, such as this "Dictionary", which is similarly "open". There is no charge for using it, and we hope that people will find it helpful. In the same spirit as the Open Source movement, we hope others will contribute to its continuous improvement through their proposed additions, comments, and critiques.

- **Orchestrate:** This is the process of managing the deployment of time, tasks, people and other resources, as needed, in support of the learning process. At iMEdTrust we are developing technological resources that will enable the high level of individualization we seek in our educational program, and ensure the cost-effective utilization of our space and resources. The Adaptive Medical Education program we are developing and sharing with our Partner Medical Schools and other educational organizations will not be possible without this orchestration function.
- **Outcomes (of learning):** In our program we will expect our students to pursue 3 primary categories of learning outcomes:
    - The requirements of the regulators (that is, the GMC, which sets the standards for medical graduates to qualify for Primary Registration as a UK doctor, and/or the required outcomes expected by the regulators in each candidate's home country)
    - The outcomes we want all students to achieve, some of which are in addition to those required by the regulators (see 21st Century Doctors)
    - Any additional outcomes that a student chooses to pursue, beyond those specified above, which are within of the scope of iMEdTrust's or its partners' resources and we agree to support.
- **Ownership:** (of learning): "Student ownership of learning" is somewhat akin to student empowerment. Helping students take control of their own education is both a strategy and an outcome. Paradoxically, ownership doesn't need to be "given" to students if it hasn't been taken away in the first place. Young children who haven't been damaged by inappropriate child rearing traditions or outdated educational practices are irrepressible learning machines. If you haven't done so before, try spending just a few minutes with a healthy, unconstrained 1-year old, amidst an array of available, safe objects. Such an experience typically provides a vivid illustration of "ownership of learning". Such children's inquisitiveness, persistence, and focus can be impressive, and can serve to clarify what we might be able to salvage in those of our learners who haven't been irretrievably damaged by past experiences.

In our iMEdTrust programs we will do our best to find and select for our educational programs candidate students who have been taking ownership of their learning all along. Our task, then, is to avoid getting in their way, combined with providing some sense of

direction and the resources they may need as they continue their ongoing learning processes. Finding enough of those types of candidates may not always be achievable. For the additional students we may choose to select, we will do our best to find those who still have a potential for taking ownership of their learning. We are committed to making the process of becoming and being a mature learner one of our highest priority educational goals. We consider the acquisition of typical medical school "content" (the information and skills that tend to dominate most curricula) to be of secondary importance compared to achieving the foundational, essential outcomes associated with being and remaining a highly effective learner. If the latter isn't accomplished, achieving the rest can be hollow, time-limited achievements.

- **Partner Medical Schools:** (and other partners)**:** We are in the early stages of developing relationships with leaders in various low-resource settings toward establishing some of our most important future partnerships. We are beginning to plan with, and are seeking additional people and locations that are interested in joining with us in helping expand their capacity for educating doctors and, ultimately, other health professionals, for providing badly-needed healthcare services for their local populations. This is a long-range project.

  During the next several years we will be establishing our pathfinder campus in London (iNSoMed), where we will begin educating students who are from and are committed to returning to the countries with which we will be developing these partnerships.

  At our initial campus we will be devising, testing, and refining the systems and resources that will be adaptable and scalable for use in the various economic and cultural settings of our partner programs in low-resource areas. Our support will help current and new programs develop and expand their capacities at highly favorable costs. These same new systems and resources will also be relevant to educational programs in well-resourced parts of the world, which is the basis for another set of partnerships that are also evolving.

  At iMEdTrust, we have and are developing working relationships with well-established, progressive, educational and healthcare-related organizations, including universities and medical schools, in the UK, the US, and elsewhere. Partly, we will be undertaking jointly designed, collaborative educational research programs. Partly, building on their current activities, they and we see us as a potential test bed for the early stages of devising, studying, and tweaking ideas for the future of medical education and health care. They and we see the needs of future-focused education and healthcare, especially in relation to the needs of total populations, as going beyond what we now call primary care.

  We and our partners consider iMEdTrust as having available a vital condition for transformative, needed change: we are less constrained in designing and implementing future-oriented programs than are institutions that have traditions and faculty members that are well established (and, too commonly, resistant to departures from familiar approaches). In general, well-established, large institutions tend to have less of the flexibility needed for leading-edge program design and adaptation.

  Our list of partner organizations will be regularly updated on our web site.

- **Pathfinder:** A program or system that helps serve as a guide toward, or a model of, new directions for other institutions. In our situation we are referring to the role of our initial, home campus (iNSoMed), where we will be implementing and researching the new educational approaches and supporting resources (including technologies) that will be offered to our Partner Medical Schools and other educational programs for adaptation and possible adoption.
- **Pathways:** See Learning Pathways
- **Peer Learning:** At all levels of education, there is now wide acceptance that peers (whether learners or teachers) can learn from each other's unique backgrounds, experiences, and perceptions. If learners are at similar levels of newness regarding a particular learning task, say, a patient care procedure such as treating an injury, peers or near-peers are more likely than experts to be in touch with each other's concerns, potential sources of confusion, and points of likely difficulty. Experts tend to have forgotten what it was like to be a beginner in areas they mastered in the past. (See curse of knowledge.)

  There will be many opportunities for our educators and learners to participate in both formal peer learning (as in our Collaborative Learning Groups) and in the informal learning groups we expect will emerge spontaneously in the campus residence halls. The design of our iMEdTrust campuses includes facilities that support the formation of peer learning groups.
- **Placements:** See, also, Clinical Experiences and Clinical Rotations. These are common forms of learning experience in medical education, in which students spend extended amounts of time in real clinically-relevant settings. In many programs these experiences involve working and learning in hospitals. Increasingly, medical schools are having some of these experiences involve time in community-based clinical settings, sometimes with an individual doctor, sometimes in a multi-doctor medical clinic. At iMEdTrust, learning placements will involve considerably less time than has traditionally been spent in hospitals. Our students will be learning mainly in community-based primary care (ambulatory) clinics. Our students will also have placements as members of functioning research teams. In preparation for potential leadership roles in their home communities, iMEdTrust students will also have placements in other community settings that are relevant to healthcare and to the formation and maintenance of health-related habits and attitudes, such as schools, health clubs, nutritionally-conscious restaurants, and nursing homes.
- **PDSA Cycle:** (Plan, Do, Study, Act): This is a systematic series of steps for gaining needed understandings in support of the continual improvement of a product or process. This cycle, which derives from continuous quality assurance efforts in industry, is now applied to a wide variety of processes, including education. It is also known as the Deming Wheel, or Deming Cycle in honor of W. Edwards Deming who made many contributions to statistical analysis, systematic thinking, and

quality improvement, especially in processes associated with manufacturing.

The cycle begins with the **Plan** step. This involves identifying one or more goals or purposes, formulating a theory, if appropriate, defining success metrics and putting the plan into action. These activities are followed by the **Do** step, in which the elements of the plan are implemented. Next comes the **Study** step, where outcomes are monitored to test the validity of the plan for signs of progress and success, and/or signs of problems and areas needing improvement. The **Act** step closes the cycle, integrating the learning generated by the entire process, which can be used to adjust the goals, change methods or even reformulate a theory. These four steps are repeated over and over as part of a never-ending cycle of continual improvement.

Aspects of this systematic approach are influencing our iMEdTrust planning and continuous improvement processes. To some extent this cycle is related to the more recent Agile approach to software development, which is also part of our thinking, and of various aspects of our overall program. We consider this way of thinking to be overdue as part of the larger need for bringing an institution-wide coordination and reform to the frequently unsystematic processes that characterize much of current medical education design and implementation. This cycle also informs and supports aspects of our Adaptive Medical Education approach.

- **Platform:** As we use this term, our platform is the foundation on which a variety of services and resources are built. When effectively done, a platform enables whatever communication, information exchange, data extraction, or other processes will be needed as the overall system grows over time. For iMEdTrust, we are designing a digital, "cloud-based" platform that will support:
    - our Adaptive Medical Education Management System (AMEMS)
    - the online components of our formative assessment (data gathering and feedback) system
    - our ongoing educational research
    - private and public communication among students, faculty, and staff
    - our orchestration of space and other physical resources, and more

  for our many local and international operations.
- **Population Health:** This is a set of ideas and approaches that focuses on improving the health of entire human populations. Achieving the aims of population health is increasingly recognized as requiring, among many other steps, a reduction in the health disparities between and within various population groups. Thanks to the work of the World Health Organization (WHO) and others, there is growing acknowledgement that prominent among the factors needing attention are the social determinants of health (SDOH).

  Having a concern for population health involves a considerable change in focus from the individual-person orientation of much of mainstream medicine. These aims also go beyond the programs pursued by the conventional versions of the field of Public Health, although that field is evolving and, in some settings, is closer to what is becoming considered

population health. Traditional Public Health has tended, mainly, to provide top-down, impersonal interventions. The newest approaches to population health involve deep engagement with communities and their resources, including their schools, their faith-based groups, and other agencies that are in a position to know their constituencies well, and to be able to exert constructive influences on the attitudes and daily activities that are part of achieving and sustaining health, if they choose.

- **Portfolios:** (in education; see, also, Learning Logs): In some medical schools, students create portfolios in which they record their plans and reflections, and they may save documentation of their experiences, educational products, confirmations of skills acquired, and assessments by others. Portfolios were initially kept in simple three-ring binders, but are now increasingly being kept online as electronic portfolios (also known as e-portfolios, digital portfolios, or online portfolios), and, when used effectively, are updated often.

  Portfolios may include text-based records, electronic files, images, multimedia, blog entries, and relevant hyperlinks. E-portfolios are both demonstrations of the user's abilities and they can serve as platforms for self-expression. An e-portfolio can be seen as both an accumulating record of personal accomplishments and, itself, a demonstration of an individual's evolving capacities for reflection, self-awareness, self-assessment, and systematic planning, among other needed professional capabilities. Our iMEdTrust Adaptive Medical Education Management System (AMEMS) will include guides to effective portfolio development and serve as the context in which each learner's portfolio is recorded.

- **Privacy:** (Data Security): In iMEdTrust's educational and research programs we will be gathering, storing, analyzing and sharing large and growing amounts of information by and about the students and faculty members who use our Adaptive Medical Education Management System AMEMS. In addition, we will be gathering video recordings of a wide range of simulated and real interactions among iMEdTrust students, faculty, and others, including the patients with whom they work. Much but not all of that information will be systematically anonymized. To ensure that everyone's privacy is fully protected, we will use the latest and most robust data protection techniques available. We anticipate being in full compliance with the standards required in the US for the privacy and security of health-related information (the Health Insurance Portability and Accountability Act HIPAA). For now, those requirements are being increasingly accepted, internationally, as the reference standard for the protection of health-related information, and are considered appropriate for the protection of other forms of private information.

- **Primary Care:** (Family Medicine, General Practice): Although some groups argue that there are differences among these 3 related groups, for our uses in this document we consider these 3 pairs of words, and the abbreviation GP, to be interchangeable. In our context they all refer to the medical practice specialty that provides front-line, ambulatory care for unfiltered (that is, non-pre-selected) patients and families of all ages. (Many general paediatricians and general internists, even some gynecologist, are the first point of contact with the healthcare system and consider themselves to be primary care

specialists, although they provide care for a narrow range of people and situations.) Contrary to a fairly widely held perception, we consider this specialty the most challenging of all in medicine. Appropriately prepared GPs are equipped to provide a wide range of diagnostic, preventive, interventional, social and psychological contributions to the care of people of all ages. Many of the patients they assist cannot be classified in conventional diagnostic terms. Some of their patients' situations involve social, economic, and cultural factors in combination with biological and psychological conditions.

Rendering effective care in these circumstances can be meaningfully more challenging (and for well-prepared doctors, more rewarding) than being a sub-specialist who repeatedly performs some relatively narrow (although needed and helpful) procedure, often with little or no awareness of the human context of the disorder being managed.

GPs of the type we intend to prepare, are highly oriented to anticipatory care, that is, to illness prevention and health maintenance. They are sensitive and responsive to each patient's family, community, and cultural contexts, and they incorporate those understandings into their management recommendations whenever appropriate. Such GPs tend to work in inter-professional teams, providing collaborative, multi-faceted, long-term care, according to each patient's needs and circumstances.

- **Problem-based Learning (PBL):** Problem-based learning (PBL) is meant to be a student-centred approach to learning, in which students learn through the experience of seeking to understand and solve an open-ended problem. Done effectively, students learn ways of thinking systematically as well as specific information and concepts related to the selected topic. The PBL approach was refined and disseminated in the 1960s by the late Howard Barrows and colleagues at McMaster University School of Medicine. It has since been implemented in a large proportion of the world's medical schools, and in other professions, although not always in a consistent or effective way.

  As with many educational innovations, the effectiveness of PBL depends, in part, on the extent and appropriateness of the preparation of those who are the educators; in this context, those who facilitate the PBL discussion groups. Done well, PBL cultivates active learning, helping students develop effective problem solving skills, become self-directed learners, and gain collaboration skills. Working in small groups (often about 8 students), the learners' tasks include identifying what they already know, what they need to know, and how and where to pursue the information and understandings they need so that they can interpret and propose solutions to the presented problem. In those programs where it was done well, PBL represented a dramatic shift from traditional educational approaches in medicine, which were, and in places still are, highly lecture-based. During the half-century of implementing and studying PBL, many lessons have been learned, and, understandably, many variations have appeared. At iMEdTrust we will be using what we regard as the best of the lessons learned from PBL, although our Collaborative Learning Groups will only bear a partial resemblance to the original intentions and approaches of that set of strategies.

- **Procedural Learning/Memory:** (also called “implicit learning”): This is the set of processes involved in becoming able to perform complex skills (playing a sport, playing a piano, driving a car, doing surgical procedures). Unlike declarative learning, procedural learning can happen somewhat automatically, with multiple repetitions, without conscious focus on the steps or methods involved. When needed, procedural memories tend to be retrieved and used for the performance of the procedures involved. Procedural memory is a type of long-term memory. Fairly widely, although not fully accurately, people have believed the observation that one never forgets such capabilities, as reflected in the generalization, “one never forgets how to ride a bicycle”. In fact, complex skills can deteriorate if not practiced regularly. (For example, because of this risk of deterioration, pilots must fly regularly if they want to legally retain their license.) Procedural memory is created through "procedural learning"; that is, repeating a complex activity over and over again until all of the relevant neural systems work together smoothly and automatically. Contrary to the commonly held assumption that performance skills improve automatically with simple repetition and nothing else, the evidence is strong that deliberate practice (practice with reflection, self-assessment, and opportunities for receiving good coaching and constructive feedback) accelerates and consolidates the learning of such skills.
- **Process:** (in and of education): W. Edwards Deming (a 20th century leader in Continuous Quality Improvement) is credited with the observation: “If you can’t describe what you are doing as a process, you don’t know what you are doing.” (As an example: If you aspire to be a fine writer, do you try to understand the processes of sentence construction and idea sequencing, and the many other processes used by writers you admire?) In medical education we have a tradition of giving more attention to “content” (what we know and what we do) than to “process” (how we know and how we do). A small but growing number of educational leaders have been making important changes in educational approaches, with the aim of shifting the balance toward greater attention to process (although content remains important and is most frequently treated as the dominant area of focus).

  We and others are devoting expanded time and attention to helping learners develop and refine a variety of “process capabilities”, such as being highly effective communicators, being able to earn and sustain the trust of patients and others, being skilled at defining and pursuing relevant questions, and much more. In the iMEdTrust educational programs we are giving at least equal attention to process as to content, in our Educator Development Program (EDP) for faculty members and in our overall curriculum for students.
- **Professionalism:** (in education and healthcare): Medical leaders have been showing a growing concern for professionalism, as reflected in developing and expecting students and faculty to observe explicit codes of behaviour. As a specific example, National Health Service (NHS) England is giving substantial attention to the process of values-based recruiting. Although these concerns have grown considerably in recent years, they are not new. For more than 2-½ millennia, versions of the Hippocratic Oath have been recited by medical students in many parts of the world. In this century there has been a resurgence

of interest in the professional behaviours of doctors. More than 130 medical organizations across the world have endorsed the Physician Charter initiated by the American Board of Internal Medicine in 2002. The fundamental principles of the Physician Charter are the primacy of patient welfare, patient autonomy and social justice. The Charter also articulates professional commitments of physicians and health care professionals to:

- professional competence
- honesty with patients
- patient confidentiality
- maintaining appropriate relations with patients
- improving quality of care
- improving access to care
- a just distribution of finite resources
- scientific knowledge
- maintaining trust by managing conflicts of interest
- professional responsibilities.

Other organization have given primary attention to respect, altruism, integrity, honesty, compassion, and empathy.

In our iMEdTrust educational programs we are taking professionalism very seriously. Along with others we see professionalism as a core component of medical learning and development. We consider readiness to become and be a professional as a key factor in shaping our selection of students. We consider appropriateness as potential role-models of professionalism as a key factor in faculty selection, as well as in our Educator Development Program (EDP), and in our priorities during the educational process, including our debriefings, our formative assessments, and in the outcomes we emphasize.

In addition, we seek professionalism in the conduct of our overall educational program. We have summarized our values and intentions in our iMEdTrust Education Manifesto. We will continue to refine these statements, and we will ask our incoming faculty and students to accept them as a guide to their participation in our program, as well as offer recommendations that may contribute to the evolution of this document.

In addition, we are designing our overall approach to help our students feel they are in the process of becoming professionals from the first moments of their acceptance into our program. They will be treated with the same respect and dignity as the established professionals with whom they will be working. They will be encouraged to reflect on their process of transitioning from seeing themselves (if they do) as students who are dependent on teachers and others for directions to being actively engaged in taking charge of defining and pursuing their own goals. We want to help them move steadily toward understanding and feeling what it means to be truly responsible for their own choices and activities. We want them to begin perceiving themselves as collaborators in the ongoing process of helping our educational program become stronger and stronger.

- **Public Health:** (From the Centers for Disease Control and Prevention - CDC Foundation) Public health is the science of protecting and improving the health of families and communities through promotion of healthy lifestyles, research for disease and injury prevention and detection and control of infectious diseases. Overall, public health is concerned with protecting the health of entire populations. These populations can be as small as a local neighborhood, or as big as an entire country or region of the world. Public health professionals try to prevent problems from happening or recurring through implementing educational programs, recommending policies, administering services and conducting research. Clinical professionals, such as doctors and nurses, focus primarily on treating individuals after they become sick or injured. Public health focusses on a bigger picture. Public health also works to limit health disparities. A large part of public health is promoting healthcare equity, quality and accessibility.

  Some leaders in medical education are striving to bring the domains of public health and medical practice closer together, in their goals and activities.

- **QAA (Quality Assurance Agency):** This is an independent body entrusted with monitoring, and advising on, standards and quality in higher education in the UK. This agency is independent of government and of higher education providers, and is charged with acting in the public interest, for the benefit of students. The staff members review higher education providers to check whether they meet agreed-upon UK expectations. Their responsibilities include advising government on applications for degree awarding powers and the right to be called a university in the UK, which is centrally relevant to our plans for iMEdTrust. See, also, Threshold academic standards.

- **Question-based Learning:** Not long ago much of medical education was based on efforts to transmit information to students, by lectures, bedside pronouncements, and reading assignments. As we've come to understand the learning process better we've been gradually enlarging the use of questions as a springboard to fostering curiosity and learning. This question-based approach is commonly experienced in variations of *problem-based learning* (PBL), developed and implemented during the last half-century. Among the variations are some of the implementations of task-based learning, case-based learning, and workplace-based learning. There are wide differences among the ways in which these approaches are offered, even, in some cases, in the same institution.

  A component of some of the implementations of PBL and its variants, in the hands of some educators, involves moving from emphasizing the questions that are asked by teachers to encouraging the learners to formulate and ask questions; not questions that seek information from their teachers or other sources, but questions that grow out of their curiosity and eagerness to enlarge their understandings. There is slow but growing recognition that learning tends to proceed best when people take their own initiatives in their explorations, as manifested by asking and pursuing their own questions. These questions are usually best when they derive from their own observations, experiences, and confusions.

At iMEdTrust, we are supporting our students' learning to conceive of questions that are springboards to new understandings and deep learning in multiple ways. We are preparing our educators, through our careful recruitment and through our extended Educator Development Program (EDP). All our educators will encourage students to be routinely reflective. Also, our students will spend extended amounts of time as members of research teams that are devising and pursuing questions continuously. Our facilitators and clinical supervisors will help their students think of questions to ask more than expecting them to answer questions.

- **Questions:** Questions are at the foundation of **Adaptive Medical Education** (AME). In AME, both learners and educators are encouraged to continuously raise questions in response to tasks, exercises, readings and experiences. These experiences may involve interactions with simulated or real patients, being engaged in planning and conducting research, using online educational resources, such as iMEdTrust's Adaptive Medical Education Management System (**AMEMS**), or engaging in exchanges with others. In our program, both educators and students are encouraged to regard questions as often being the optimal response to events. Questions can be the launchpad to further learning and to scientific inquiry. Becoming a habitual and effective question-asker is basic to becoming a mature learner. Having a growing repertoire of questions is an important part of being effective at reflection and learning from experience. Our iMEdTrust educational program will be focused less on helping our students learn to *answer* questions and more on helping them learn to *ask* appropriate questions; that is, questions that lead to their pursuing explorations, investigations, deeper interactions with patients, and, in general, to achieving more complete learning. Being capable of formulating and asking appropriate questions is foundational to being an effective educator, learner, diagnostician, clinician, and researcher.
- **Rapidly Responsive Computers:** Contemporary computers, even compact laptops, tablets and smartphones, have surpassed the large computers of a relatively short time ago, in speed, memory and processing capacity. These characteristics make possible the memory-support and decision-support capabilities that can significantly change the landscape of education. As others and we are seeking to do, exploiting the potential of these devices can enable dramatic changes in what we expect of learners, and in what we expect of ourselves as educators. We are doing our best to ensure that the iMEdTrust program will serve as one of the models of how to benefit from the impressive potential that is now available at reasonable and declining cost.
- **Readiness:** (of learners) Our iMEdTrust commitment to Adaptive Medical Education is built, in large part, on continuously seeking an optimal match between what we expect of learners at any point in time and what each individual learner is ready for at that time. Their readiness is a function of multiple variables, some of which are their:
    - capabilities in the domains of current interest
    - maturity as learners
    - deeply-held assumptions and attitudes (both recognized and hidden)

- outside circumstances and pressures in their personal lives
- capacities for managing different kinds and quantities of stress.

Expecting significantly more of learners than they are ready for is educationally inefficient, even futile and potentially hurtful. It can be a source of damaging levels of stress, and can contribute to establishing negative attitudes toward the experiences and goals of the moment or even toward learning in general. Expecting less of learners than they are ready for is also inefficient and can be hurtful in other ways, potentially contributing to boredom, disinterest, withdrawal, and lost of potential.

To be optimally effective, educational programs need a capacity for continuously determining and adapting appropriately to each learner's individual readiness. At iMEdTrust this will be part of our ongoing diagnostic assessments. They will be done routinely by well-prepared educators and by our learning management systems, our Adaptive Medical Education Management System (AEMS), We will continuously adjust our expectations so that they are matched to each learner's individual level of readiness. We will devise expectations that each learner finds challenging but achievable. Our goal is helping all learners stay within their unique eustress zone. The fact that each learner's level of readiness at any given time is a function of many factors, including their particular response to different kind and quantities of stress, justifies the need for a truly individualized learning system, as we will have.

- **Reflection:** Unlike the more conventional use of this word, which suggests a mirror, in education (as in psychotherapy and other domains), we are implying a mental process that focuses on self-awareness, with the goal of being as accurate as possible. Our intent is to approximate full awareness of our thoughts, behaviors, feelings, experiences, and more. And, unlike our experiences with mirrors, the reflections of interest to us here are far from being automatic or predictable.

Getting to be constructively effective in our reflections takes a great deal of deliberate practice, which usually requires skilled, knowledgeable, supportive mentors and supervisors. Becoming routinely reflective is also a habit of mind, closely related to the notion of being mindful. That is, it is a way of functioning that is best when it is a routine part of daily living. People who are constructively reflective are regularly inclined to think systematically about their experiences, while those experiences are happening, as well as in retrospect. Many professionals also engage in anticipatory reflection: they bring an inclination to raise questions to all phases of their experiences, before, during, and following events in which they participate. Such reflection is a key to learning effectively and fully from experiences. And it is a foundation element of safe clinical practice.

Both educators and clinicians need to have some questions that they seek to answer (reflect upon) routinely, during all phases of events in which they participate. For example:

- Prior to an event: How did it go last time? Were there any problems that I want to try ensuring that I avoid this time?

- During an event: What am I noticing about my feelings that are relevant to what I need to do next? What might I learn from what's happening right now in my relationship with this student/patient?
- After an event: Was it what I expected? What lessons can I take away from this event?

Learning to be reflective during an event is one of the more difficult skills that clinicians and educators need to practice and continuously refine. Reflection-during-action is a challenging form of "multi-tasking"; it involves the capacity to shift rapidly back and forth between giving full attention to being a participant in the event itself, while alternating frequently but briefly with being disconnected from the event sufficiently to be an accurate observer of what is happening, both externally and internally. These processes require a considerable amount of explicit, deliberate practice**.** These are the habits and skills underlying our capacity to "edit" ourselves, to adjust our actions on-the-fly, an instant before they happen.

- Reflective: The process of having the needed attitudes, perceptions and awareness required for engaging in productive reflection.

- Regulators: In the context of medical education, these are the agencies responsible for determining which doctors are fit for clinical practice and which educational programs are acceptable for preparing doctors. In the UK this process is the responsibility of the General Medical Council (GMC) and the Quality Assurance Agency for Higher Education (QAA).

- Relationship-centred: (education; clinical practice)**:** At the heart of educational and clinical experiences are human relationships, as is also true of several categories of research and the exercise of leadership. The quality and character of these relationships are central to the ultimate success of these forms of transaction. In these contexts, the quality of the process depends in large part on the capacity of professionals (educators, clinicians, researchers, leaders) to earn and sustain the trust of the person/people being served/helped/studied. Trust is a critical variable in determining the extent to which the "clients" (students/patients/others) are fully forthcoming about their experiences and needs, and the extent to which any advice that is offered is considered worthy of being followed. At iMEdTrust we will place considerable emphasis on cultivating and sustaining open, caring relationships in all the human transactions that are part of this enterprise. This core component of our institutional culture will play a large part in our recruiting and selecting learners, educators, staff and administrators, and in the focus of our efforts in our Educator Development Program (EDP) and in our regular student-education program.

- Relationship Skills: These skills are vitally important contributors to the quality of patients' experiences, and the outcomes from their encounters with the healthcare system. At iMEdTrust we consider the quality of personal relationships to be central elements of concern for both clinicians and educators in much of the work they do.. (See: Relationship-centred)

- Reliability: This term relates to two distinct components of educational undertakings:

- a characteristic of the people who are involved in an organization's processes
- an important feature of the findings of research projects, and of the conclusions reached from assessments of students' learning.

The first meaning refers to the extent to which staff, educators and learners are reliable; that is, how fully they can be counted upon to complete projects, to keep promises and, in general, to meet or exceed mutually agreed-upon expectations. At iMEdTrust we are seeking to prepare graduates who will be consistently reliable throughout their careers. Achieving such a set of educational outcomes for learners requires specific approaches, some of which are different from what has been done in traditional medical education. Such outcome goals bring implications for our selection process, our role models, our cultural features, our daily interactions, our explicitly conveyed expectations, and the focus of the assessments we do. These will all be central considerations as our programs evolve.

For our purposes, the second meaning refers mainly to aspects of the process of arriving at judgments of student performance, which is what educators do when making summative decisions. To make such decisions we need data gathering procedures that are as technically reliable as possible. Here, reliability refers to the extent to which the information-gathering processes (such as separate observers, examiners, or tests) produce the same result as each other; or similar results emerge when a set of measures is applied repeatedly. Without such agreements, we aren't justified in considering our conclusions about student performance from any one source to be as dependable, that is, as usable as we should want them to be.

Even if assessment measures are shown to be technically reliable, they may not be appropriate for decision making. Most of the capabilities that doctors need are complex and can be sensitive to the context in which they are demonstrated. We consider it seriously wrong to assume that a single assessment, or a single number can dependably provide an adequate description of a person's capacities in any of the relevant, complex areas of medical competence. At iMEdTrust we are choosing to reduce, even terminate, the practice of having conventional "final" exams, to the extent we are permitted to do so by regulators.

Instead, we will be turning to large data sets about each student's experiences and performance, from which we expect to get closer to doing justice to the broad range of capabilities we want our students and graduates to have. In other words, we're persuaded that we will have access to genuinely more reliable (and valid) information than can be gathered in single-event, high-stakes testing. We intend to make our summative decisions (e.g., should students progress to the next phase?; graduate?) on the basis of richer, more reliable and valid information than can be collected by high-stakes (summative) testing.

- **Research Experiences:** At iMEdTrust we want all our graduates to think like scientists in all their professional work and decision-making. We will support that outcome in virtually all our interactions, whether in meeting rooms, the simulation centre, the clinic, the hospital,

or when they are members of research teams. In these latter settings we will give focused attention to research processes. We will seek to have all of our educators convey and expect the attitudes of seeking, respecting, and understanding the limits of research findings.

The specific areas of focus of the research experiences, which we will help our students arrange, will grow out of their areas of interest, their prior experiences, their career plans, and any requirements that may be part of the outcomes expected by regulators. We anticipate that our selection process and our institutional culture will result in a fairly wide range of domains of interest and durations of time spent as members of research teams by different students. During our students' times as members of research teams, regardless of the domain that they and their host team are investigating, our research-educators will emphasize the principles and processes underlying effective research planning, research conduct, the asking of appropriate, well-informed questions, the analysis of findings, and arriving at defensible, if tentative, conclusions.

- Research Teams - to be added

- **Research Scholarship:** We expect that the dominant areas of focus of the research being conducted in-house in iMEdTrust, by our full-time faculty, to be in the educational and healthcare domains. Our students will also have available a wide choice of research teams to consider joining that are doing basic or applied biomedical or clinical research. At our pathfinder, London campus (iNSoMed) we will be surrounded by research groups of the highest quality, based in nearby institutions with which we have or will have partnership agreements. Our initial explorations lead us to anticipate that we will have many attractive opportunities available from which our students may choose.

  We anticipate that many of our students will want and will get research experiences in one or more programs within our Health Professions Education Research Institute. There, they will have choices among a wide range of basic, applied, and design-based research projects, with attention to both quantitative and qualitative investigations. They will gain experiences and competence in the scientific process as well as in larger, conceptual issues that will be relevant to their preparation for eventually becoming leaders of development and constructive change in their home communities.

- **Residency:** (education programs): Medical residency is a post-medical school phase of preparation for certification in a medical specialty (including primary care) and for approval to practice as a physician in the United States and Canada, and in other countries, although different names may be used in different location. Most residency programs fall in the range between 3 and 5 years after medical school, but some take more, and sub-specialization can also require one or more "fellowship" years. Those in a residency are called "residents" or "house officers". The majority of residency programs remain hospital-centred, although most medical practice is now conducted outside of hospitals.

  An increasingly voiced concern, with quite limited action so far, is the legacy separation of the medical school and residency phases of learning. There is some recognition that learning could be more efficient and effective if these two segments of doctor preparation

were coordinated and integrated more effectively. There may be some early readiness for trial efforts in that direction. There are also early signs of movement toward recognizing that residencies, like medical schools, should be outcomes-focused, rather than having fixed, pre-prescribed durations.

- **Resources:** As we use it here, “resources” imply anything that can support the learning process. Resources can include people (e.g., simulated patients, faculty members), space (e.g., a room), equipment (e.g., or simulator/mannequin), digital utilities (e.g., a specialized exercise on the Adaptive Medical Education Management System AMEMS), time in a clinic, or any other support that needs to be reserved, or otherwise arranged for in advance (orchestrated).

- **Role Model:** After being introduced by the sociologist Robert K. Merton more than a half-century ago, the phrase "role model" has become widely used in many situations, including sports, business, and the entertainment media. In education, generally, and as we intend it for our iMEdTrust educational programs, the phrase role model has specific meanings and implications: a person whose behavior, attitudes and examples may, intentionally or not, exert an influence on others, especially students. The extent to which any one person exerts a lasting influence through the examples of her/his behavior is subject to many variables, including:

    - the stage of development of the student being influenced
    - whether that student is subject to similar or different role models during that phase of their development
    - the esteem with which the person (role model) is held by the student and others who the student admires
    - the relative degree of power the role model has in relation to the learner, and much more.

  As clarified by the work that has been done on the hidden curriculum, role models can have desirable or undesirable effects.

- Role Play – to be added

- **Scaffolding**: In education, scaffolding is the process of providing learners with extra support as they deal with new material that they find difficult. A variety of strategies and resources may be offered, depending on the domain and the degree of difficulty. These extra supports would typically be gradually removed as the student(s) gain facility and comfort with the new concepts, understandings, skills or other aspects of the learning they are expected to pursue. Scaffolding bears a close relationship to our iMEdTrust plan for Adaptive Medical Education. Our approach tends to be more comprehensive and more individualized than the ways in which scaffolding is most commonly offered in schools, if it is offered at all.

- **Self-assessment:** (in education): For the iMEdTrust educational programs we view self-assessment as the process of becoming as accurate as possible in perceiving the strengths and limitations of one’s own capabilities, performance and potential, in areas that

are relevant to professional development. In our view, self-assessment needs to be a routine component of the continuous reflection that is part of being an effective clinician and educator (as they are part of the routines of professional athletes, actors, musicians and others who have high standards but who also function alone much of the time). Without a coach by our side as we fulfill our responsibilities, we need to do our best to monitor our own performance and make the moment-to-moment adjustments that are needed for being optimally effective. Among the component elements of effective self-assessment are:

- high levels of situation-awareness
- an inclination to be continuously reflective during one's work
- openness to the constructive feedback available from others.

All of these elements and others require explicit attention during learning, and considerable practice with the guidance of a suitably equipped educator (coach). We see focusing on becoming reasonably accurate as a self-assessor as being a core part of becoming and remaining a mature learner and, ultimately, a safe, effective professional. It is basic to deliberate practice, as studied by Anders Ericsson and others, and to a lifetime of self-directed learning. It is also an important part of being an effective participant in and contributor to the collaborative learning environments that we consider necessary preparation for the collaborative clinical practice needed in contemporary healthcare. These abilities are sufficiently complex and important in shaping the quality and safety of clinical practice and educational effectiveness that they deserve to be a focus of attention throughout one's career.

- **Self-directed Learning (SDL)**: This phrase and related ideas have been in fairly wide use in educational and corporate settings for at least a half-century. The implications intended for learners' behaviors have been quite varied, ranging from having them make the simplest of choices, to expecting them to undertake complex, integrated planning and actions. In some contexts, the use of SDL has involved having the learners take initiative in:

    - "diagnosing" their learning needs
    - specifying their learning goals
    - selecting the resources that they will use to support their learning
    - devising or choosing the learning strategies they will pursue
    - assessing the outcomes of the overall process.

  Commonly, those who implement SDL in their programs view learners as the owners and managers of their own learning process. In our iMEdTrust context, we see SDL as a vital but highly flexible set of approaches and expectations that are closely tied to our Adaptive Medical Education (AME) strategies. On one hand, we want our learners to become committed to and highly capable of pursuing SDL throughout their careers. On the other hand, we recognize that different medical students arrive with different levels of readiness to engage in fully independent SDL. Our candidates' capacities for SDL will be an area of focus in our selection and planning processes. We will expect some level of readiness for

SDL at the time of acceptance for entry to medical school, but we will be prepared to help our students become increasingly capable of independently pursuing their own learning over their time with us.

In all of our AME we consider the best of education to be that which is reasonably accurate in determining each learner's strengths, needs and readiness, in relation to the desired and required outcomes, and which then provides the direction and levels of supports that are optimally matched to the learners' needs. In some settings, as it will be in ours, SDL can be highly collaborative. At iMEdTrust, learners will collaborate with their educators and peers, while being expected to take as much independent initiative as they are ready for. In other words, our form of SDL won't be one set of expectations or activities. It will take many forms, depending on the uniqueness of each learner and the current context.

- **Simulation:** (Simulation-based learning): Simulation is the replication of part or most of a set of real-world tasks, processes, or systems to achieve specified educational purposes. Simulation has been used in support of aspects of learning for centuries, although it only began to be systematically adopted and studied on a fairly large scale, as an accepted approach in health professions education, in the 2nd half of the 20th century. The active implementation of simulation has been expanding rapidly in the 21st century.

The design of simulations that will be effective in enhancing learning requires that a model be developed, representing relevant physical and/or behavioral characteristics of the system or processes being represented. For example, in the health professions, for the learning of communication and relationship understandings and performance skills, a live actor (amateur or professional) can be guided in becoming a simulated patient, with a defined set of concerns, symptoms, and personality characteristics, providing learners with opportunities for practice. Similarly, for the learning of such complex performance tasks as delivering a baby or administering an anesthetic, computer-controlled manikins are now available that can replicate a range of anatomical and physiological features of a real person, enabling safe, repetitive practice.

There are now available a wide range of simulator resources that may be as simple as a piece of fruit, with a skin, such as an orange, for the earliest stage of practice of the task of giving an injection, and as sophisticated as a full surgical suite for the simulated management of highly complex problems. Simulation can offer several advantages over learning in the real-world setting. Among the most valuable of the advantages available with simulations are, for example, the following situations:

- when the real system/circumstance isn't available, but preparation is needed (e.g., preparing to manage health conditions that are present in a country to be visited soon, but which are not present in one's current learning setting)
- the real circumstance may be too dangerous or is otherwise unacceptable for learning (e.g., beginning to learn to protect oneself while caring for people with highly contagious, perhaps fatal, infections)

- where it wouldn't be safe or fair to subject real patients to the repetitive practice that learners, especially beginners, need (e.g., learning to deliver babies).

Simulation can also present the important advantage of enabling the artificial simplification of the tasks to be learned, so that learners can concentrate on one or a few sub-skills at a time, rather than being overwhelmed by the complexity of reality. (This was one of the important insights and contributions of Edwin Link in his design of the Link Trainer, which played a vital role in rapidly preparing new pilots, beginning in the 1930s, and which became a model for many of the designs and uses of simulation that followed.)

The educational strategy of simulation can be implemented in a variety of locations, under many different circumstances (not just in an elaborate simulation centre), as in the following examples:

- the impromptu decision by a group facilitator to ask two students to spend a few minutes adopting the roles of clinician and patient, representing a challenging situation and exchange they were discussing and have questions about
- the online, simulated task a student engages in on his laptop, in his apartment, which engages him in thinking through and formulating plans for a new research project
- the effort by an inter-professional student group to work out plans for a multi-generational family, in which the patriarchy is slipping into cognitive decline and there is an eagerness to keep him living at home, although the potential impact on the young children is a source of concern.

- Simulated Patients: (Also called: Standardized Patients, and SPs)**:** These are people, who may or may not be professional actors, who have been systematically prepared to represent various specific, clinically-relevant scenarios (circumstances, conditions, attitudes, relationships). They provide learners with opportunities to practice specific skills, or they may be employed for assessing learner performance, or for research. Currently, some educators refer to simulated patients as "standardized patients". We prefer the label "simulated". "Standardized" suggests scripted and inflexible.

The simulated patients we are developing for iMEdTrust are carefully prepared to be non-standardized. That is, they are capable of modifying their responses to learners' actions in ways that are as close to natural as is appropriate, with room for improvisation. For example, in response to a student who conducts an interview in a gentle, caring way, a given simulated patient will likely be cooperative and forthcoming. The same simulated patient, if approached in an unfeeling, mechanical way may withhold information or be less cooperative in other ways.[5] Some simulated patients are asked to make themselves

[5] This is not a new idea. It is the approach Jason and colleagues used when they invented the idea of using simulated patients to help medical students learn the skills of effective patient-doctor communication at Michigan State University in the mid-1960s.

available only for verbal exchanges. Others are willing to be available, if asked, for parts of the physical exam.

- **Simulation Centre:** During the 21st century, schools of the health professions have been rapidly embracing the use of simulation in support of their educational programs. For coordination and management efficiency, many of these programs have concentrated their simulation-support resources in a contiguous location, their Simulation Centre (although not necessarily using that name for their facility). These centres may be relatively simple, meant for a narrow range of learners and educational tasks. Increasingly, there are centres that serve students at multiple levels, from several health professions, sometimes separately, and sometimes in inter-professional teams, learning together. Often, these centres have a section designed for the participation of people serving as simulated patients, typically in spaces designed to replicate a conventional medical exam room (a doctor's "surgery"). Separately, but nearby, there usually are spaces for various mechanical simulators, sometimes placed in standard hospital beds, sometimes in other contexts, such as the replicated resources of emergency rooms (usually called "A&E": Accident and Emergency, in the UK), dental offices, or other contexts. Some even present replications of fully realized, elaborate surgical suites or other healthcare settings. Many centres now have sophisticated capabilities for using theatrical-type resources, such as makeup and moulage for replicating various levels of injury, trauma and types of emergency events.

  As indicated in our entry on simulation, this educational strategy can be implemented under a variety of conditions, in many different settings.

- **Situation Awareness:** In complex situations, such as piloting aircraft, managing disasters, military and police encounters, as well as many circumstances in health care and education, multiple variables may need to be monitored simultaneously for effective decision-making. In some situations, time can also be of the essence, and alertness to changing conditions may be needed to achieve success and to avoid making the situation worse. Managing such environments and circumstances well can take many skills, one set of which is now recognized as situation awareness, which has become its own field of study.

  Like other complex capabilities, situation awareness requires the development of a variety of skills and routine ways of functioning, including a capacity for high levels of alertness (being "mindful"), with wide-ranging, perceptive observations, active reflection, and more. As with other skillsets, lasting learning of these abilities requires repeated and extensive deliberate practice. Such learning opportunities are not yet common in medical education. At iMEdTrust we are persuaded that situation awareness is an important component of good medical and good educational decision-making, even in routine circumstances, so we will be giving these skills considerable attention in our Educator Development Program (EDP), and in our daily work.

- **Small Group Learning:** This label embraces a variety of educational approaches. When arranging for the numbers of learners in an experience to be more than one, but still

"small", the intentions usually are to achieve processes and outcomes that aren't as easily or as well achieved in such one-to-one situations as mentoring and advising, or in large-group experiences. One-to-one settings are important components of a total educational program since they can enable processes and outcomes that are less available or are even impossible in group settings. Large groups, however, offer little or no educational outcome advantages, and the processes available in that setting lend themselves more to announcements, rituals, and ceremonies than to predictable, desirable educational outcomes.

In general, small groups are especially appropriate when the presence of multiple people is necessary for achieving some of the educational program's desired outcomes. For example, our goals of cultivating group communication and participation skills, respect for diversity, team collaboration skills and attitudes, as well as other parts of preparing for contemporary healthcare practice, require learning in group settings. There is no single, optimal number of learners for all "small" groups. Many variables are relevant to that decision, including:

- the specific processes and intended outcomes of the sessions
- the skills of the group facilitator(s)
- the types and range of differences among the learners
- the learners' current capacities as learners and in the domains of the intended areas of focus.

In keeping with the position taken by others in medical education planning, we intend to average 8 learners in our iMEdTrust small groups. In traditional lectures the number of people in the room is often irrelevant to the outcomes achieved by individuals. Once direct personal participation is severely limited or eliminated, the numbers of people attending the event is far less influential that are other factors. In small groups, however, group size can be quite important. The presence of too few learners can diminish the value of the experience, if some of the outcomes depend on having an adequate level of diversity among the participants. Having too many learners in a group can also diminish the value of the experience, if some of the outcomes depend on ensuring that every learner has a reasonable opportunity to be an active participant in the exchanges that occur. And, to be effective, group experiences need to be carefully planned and usually require a skilled facilitator.

- **Social Accountability:** In 1995, the World Health Organization defined social accountability in the context of medical education as the obligation of medical schools to meet the priority health needs of the communities they serve. Subsequently, Charles Boelen and Robert Woollard initiated an 8-month Delphi study among relevant educational leaders and organizations, internationally, culminating with a conference that led to the publication in December, 2010 of the Global Consensus for Social Accountability of Medical Schools. At that linked site the publication is available for download in any of 7 languages. Included in that document is an expanded summary of the issues and recommendations from that work, including the brief definition, that social accountability is

the obligation of medical schools, "…to direct their education, research and service activities towards addressing the priority health concerns of the community, the region, and/or the nation they have a mandate to serve".

- **Social Determinants of Health:** (SDOH): The SDOH include the social, environmental, cultural and physical conditions into which different populations are born and in which they live. The World Health Organization's Commission on Social Determinants of Health reported (2008) that SDOH factors were responsible for the bulk of diseases and injuries and these were the major causes of health inequities in all countries. In the US, SDOH were estimated to account for 70% of avoidable mortality. In 2003, the World Health Organization (WHO) Europe suggested that the social determinants of health include:
    - Social gradients (life expectancy is shorter and disease is more common further down the social ladder)
    - Stress (including stress in the workplace)
    - Early childhood development
    - Social exclusion
    - Unemployment
    - Social support networks
    - Addiction
    - Availability of healthy food
    - Availability of healthy transportation / active travel

  A young, promising initiative in the US is the growing consortium of people and schools of the health professions that are part of the Beyond Flexner movement that is bringing increased attention to SDOH.

- **Standardized:** (education, testing): As explained in our entry for Simulated Patients, the word "standardized" implies an approach that is pre-planned so that it is not, or is minimally responsive to individual differences. Such uniformity is the obverse of the process of adaptive education. It ignores the substantial evidence that all learners are unique. Imposing standardized education or testing on groups of learners is to create a highly artificial situation in which a large array of important internal and external variables are ignored. The inescapable consequences are systems that are hurtful to learners and to the outcomes of entire educational systems.

- **Standardized Patients:** (see Simulated Patients)

- **Summative Assessment:** (Summative testing): In education, this phrase implies a type of assessment of learner performance that is often thought to be required as the basis of administrative decision-making (see Summative decisions): as, for example, when determining each learner's readiness to move forward to the next phase/year within an overall program, or to graduate. These assessments typically play a large part in the assignment of grades, and in some programs they are also the basis for allotting awards, honours and prizes. In our view, the traditional practice of relying on final, high-stakes examinations as the basis for any of these decisions is inappropriate, even a potentially

negative influence on learning. We consider the kinds of data we will be gathering on a continuous basis to provide far more reliable and valid information about learner performance and their readiness for progressing through the steps of a program than can be determined from the intermittent "snapshots" that are available from high-stakes examinations.

The widely accepted practice of expecting medical students to undergo high-stakes testing seems to us to be an example of the *process* having displaced the *purpose*. That is, the purpose of such testing has been the gathering of information to support such summative decisions as: should the candidate be considered ready to move on to the next level in the program, or to graduate? High-stakes testing has become so widely used for these decisions for so long that they seem to have taken on a life of their own. Large organizations, including major commercial corporations, now produce and administer many widely-used high-stakes exams, and most curricula are designed around the notion that students need to take and pass their tests.

Still worse, these standardized tests are being used for purposes for which they weren't intended. In medicine, the major high-stakes tests were mostly designed to serve as filters, to help with the binary decision of identifying who is ready to be trusted to continue through the process of becoming permitted to provide healthcare for patients. Too many faculty members are using these tests for the unintended purposes of classifying students, so that they can ranked and prizes awarded. These and other misuses of assessment can contribute to serious negative consequences. Among them are the conclusions among too many doctors that testing is an irrelevant, painful process, to be avoided whenever possible, rather than being perceived as a valuable component of the learning process.

No single set of events, however carefully produced, can fully overcome the inescapable limitations of trying to have a snapshot replace a movie. Human performance is subject to many variables beyond a person's demonstrated capacities at a given moment on a given day, as determined by an unavoidably limited number of measures. The accumulated records, and the systems for effectively analyzing those records that are now possible with continuous formative assessment, can provide genuinely deep and broad understandings of an individual's capabilities. This level of rich and needed information can't be matched by the limited and potentially distorted conclusions that are at risk of being the consequence of depending on high-stakes testing.

- **Summative Decisions:** (See, also, Diagnostic decisions) The primary purpose of summative assessment is administrative decision-making (should a learner be given credit for having satisfactorily completed a given course of study or a clinical rotation? Is a learner ready to move on to the next phase of the overall program?). We consider such decisions to be more reliably and validly made when they are based on carefully gathered, continuous records of performance, than when they are derived largely or exclusively from the results of high-stakes testing.
- **Supervision:** In some work settings, supervisors are seen more as managers than as educators. In those settings supervision is a process for ensuring that tasks are done

satisfactorily. The supervisors tend to be thought of as mostly exerting control and as needing to be punitive at times. The supervisor's task is seen as shaping current performance rather than as enhancing the workers' capabilities for the future.

In other work settings, and in many contemporary medical education settings, including at iMEdTrust, we see supervision as dominantly a set of educational tasks, while necessarily including some elements of managerial control. In clinical education, supervision is commonly used and needed, in part, to ensure patient safety and in part to foster learners' continuing acquisition and refinement of relevant capabilities. In some educational programs, clinical faculty members are often expect to function more as mangers than as educators because of concerns for patient welfare and safety. In our Educator Development Program (EDP) we intend to help our clinical faculty members develop the skills of successfully ensuring patient safety at all times, while still providing the kinds of supportive, collegial relationships with their students (supervisees) that make for high quality learning. Being able to carry out such a multiple-component set of roles simultaneously (educator, assessor, patient-protector) doesn't come naturally to many people. This, again, will be an area of focus and systematic practice in our EDP.

We expect that the early and extensive preparation our students will have in our simulation-based settings will help ensure that they will be effectively and continuously aware of their strengths and limitations. They will be highly unlikely to put any of the real patients they see at risk. Also, partly because of explicit preparation and partly because of the nature of our faculty-student relationships, we expect our students not to hesitate to ask for help if they have any uncertainties in patient care situations. In addition, our clinical supervisors will be carefully alert not to put our students into clinical situations for which they aren't yet ready.

- **Tasks:** A wide range of explicit activities in which learners are encouraged to, or choose to, engage as part of their efforts to master expected learning outcomes. For example, tasks may include any of the following:
    - exploring an area of interest online
    - reading a research report
    - interviewing a simulated patient
    - working with the Adaptive Medical Education Management System (AMEMS)
    - doing a physical exam of a clinic patient
    - working on inter-professional team communication skills in the simulation centre, and more.
- **Teachers (Teaching):** These are widely used terms that we suggest have lost much of their usefulness, at least for now. We propose that they need to take on generally-accepted new meanings. Too often, for too many people, these words imply a set of approaches and strategies from the past, which we are persuaded the evidence confirms are inappropriate. Many people, when using or hearing these words, think of a hierarchical, controlling relationship, in which an older authority figure offers "instructions", defines expectations that are meant to shape the learners' behaviours, and/or conveys a body of

information that is meant to be absorbed by the learners. We consider all of these implications to be contrary to the ways that worthy and lasting learning happen. For these and other reasons we prefer, and now use, the term educator. We usually avoid the terms "teacher" or "teaching", unless meaning to imply that we are discussing the outdated practices to which those words so often refer. For related reasons, we also avoid the term training.

- **Technical Experts:** At iMEdTrust this phrase refers to the mechanical and software engineers, programmers, educational technicians, and other specialized personnel who will guide and support the faculty, students and administrators in creating and maintaining the digital and other educational-support technical resources of our educational program.
- **Term:** A division of time during the academic year. At iMEdTrust this will usually comprise 14 weeks, with 3 terms in a calendar year. Not all Learning Modules will last a full term, although many will.
- **Threshold Academic Standards:** (also, Threshold Concepts, Threshold Capabilities or Threshold Outcomes)**:** The phrase "threshold academic standards" is used by the UK's Quality Assurance Agency (QAA). As defined by them, these are the minimum acceptable levels of achievement that a student must demonstrate to be eligible for a particular academic award. These threshold academic standards are set out in the QAA's national qualifications frameworks and their subject benchmark statements.

  A somewhat related notion was identified in the Innovation Pedagogy 2014 Report from the UK's Open University. They proposed that one of the 10 innovations that has the potential to help produce a major shift in educational practice is the principle of "threshold concepts". These are core concepts without which students cannot progress further in the subject to which those concepts apply. Those are considered to be areas which are difficult and unintuitive for students to learn without first mastering the prior level (threshold). For another, related notion, see, Milestones. For the iMEdTrust program we have adopted the "threshold" notion to categorize the key, intermediary steps between a learner's current capacities and those required or wanted for becoming eligible to graduate (and be registered as a doctor). Most learning experiences will be targeting threshold outcomes (sometimes called "enabling objectives"), which serve as components (building blocks) along the way to achieving the fully realized outcomes specified by the regulators (as possibly supplemented by the students and us).
- **Traditional:** (see Conventional)
- **Training:** This term is used widely in medical education, often as a synonym for instruction. For our iMEdTrust programs we are choosing to avoid using the terms "train" and "training" when referring to the educational experiences we offer, as we are also doing with the terms "teach" and "teaching". We consider these words, as they are often used, to have become imprecise or to carry misleading or inappropriate implications. "Training" seems appropriate for describing the process of having learners engage in the repetitive practice of specific tasks, with the intent of producing fairly narrow, predetermined outcomes. It is an appropriate term to describe the acquisition of some skills, as in many

sports, in some forms of mechanically-focused work, in many of the requirements of military recruits, and more. But it doesn't seem appropriate for medical professionals who face situations in which fairly sophisticated judgments and decision-making are typically required in association with the tasks they perform. We consider both "training" and "teaching" to have lost their appropriateness as labels for the kinds of learning processes we intend to have as the hallmark of iMEdTrust's educational programs. Eventually, perhaps, "training" and "teaching" will be appropriate to use again, when there are widely held understandings of those words as representing processes that are closer to implying what contemporary understandings of effective education require.

- **Traits:** The notion of traits can have a variety of meanings. Different scientific disciplines use "traits" to imply different features of people, organisms, objects, and species. In this document, and in our educational programs, we use "traits" in the sense often used by psychologists. We imply distinguishing habitual patterns of thought, emotion, and behavior of individuals, not physical characteristics. As we use the word, we consider traits to be relatively stable, but potentially changeable, over time. We regard some traits (such as friendliness, generosity, gentleness, honesty, humility, integrity, kindness, patience, persistence, personal "warmth", resourcefulness, responsibility, self-control, trustworthiness) as being particularly desirable for the students and faculty we select for our program.

  Since traits are not easily amenable to substantial modification with usual educational interventions, we will usually consider the opposites of these traits to be disqualifying during our student and faculty selection processes. (There are other characteristics that may or may not be amenable to educational interventions, which may be regarded as traits, that we will seek in our candidates, including: curiosity, dedication, and self-determination.) We emphasize that the traits we seek can be manifest to different degrees in different people, with varying levels of modifiability. We anticipate that our Educator Development Program (EDP) for faculty members and many aspects of our student education program, will help with the continuing development and enhancement of professionally desirable traits all those associate with the iMEdTrust educational programs, to the extent that such changes are possible. (Another reason for avoiding having a hidden curriculum is that constructive enhancement of positive traits tends to require consistent, repeated reinforcement over extended periods of time, with few, if any, competing influences.)

- **Trust:** "It is not the oath that makes us believe the man, but the man who makes us believe the oath." This ancient insight is credited to Aeschylus (525-426 BCE), It captures an essential feature of the process of earning and sustaining the trust of our patients, colleagues, and students, which is an essential component of effectiveness in education and clinical work. Without a solid basis of trust, students and patients may:

    - withhold uncomfortable but important information about themselves
    - reject advice (while pretending to accept it)
    - resist making meaningful, lasting changes

- remain passive and even become adversarial.

As suggested by the quotation above, the capacity to earn trust involves far more than saying the “right” things. It involves the essence of how we relate to others. High on the list of what is needed to be perceived as trustworthy are the capacities to:

- Convey understanding and respect for the other person(s)
- Be an effective listener
- Adapt one’s vocabulary, pace and other communication features to the needs of the other person(s)
- Even have something of a sense of humour and demonstrate an authentic sense of humility.

- University: In the iMEdTrust context, this refers to the umbrella organization that ties together all of our newly developing partner programs that will grow out of this initiative, and all of the established programs, with which we are also partnering, for the mutual benefit of all involved. The university will be responsible for defining the threshold capabilities required for program admission and for stages of progress for students at our pathfinder campus (iNSoMed). These requirements may be modified for our partner medical schools, as indicated below. The university, together with its Health Professions Education Research Institute, will develop, test and continuously improve the operational and educational approaches used. These approaches will be designed for scaling and local adaptation, according to the needs and characteristics of each local setting where they are to be deployed. Shared resources that have been validated as educationally effective, economically efficient and of confirmed high quality will be made available for use by our partner medical schools.

All, or nearly all, graduates of medical schools seek to be registered as doctors so that they can legally engage in clinical practice. Our university will have students from many countries, virtually all of whom will return home and want to practice there. With the multiple types of institutions and locations within our university network, we will have at least 3 types of registration for the great majority of our graduates who will be non-UK and non-EU citizens:

- registration in the UK for those who want it and who qualify
- registration for some graduates in both the UK and their local setting
- registration for some graduates only in their home setting.

- University Hospitals: (Also called academic hospitals or teaching hospitals) (To be added)

- Valid: (Validity): In research reports, in assessments of learner performance, and in clinical work, the findings we collect (which are almost always samplings, not nearly everything that would comprise assembling all relevant information) are said to be “valid” if those findings are accurate reflections of the true characteristics of the events, people, or processes that were studied or assessed. For example, if we want to assess a group of learners’ diagnostic skills, we need to ask: to what extent do our findings provide accurate information about those aspects of the students’ real capabilities? That is, to what extent

are the conclusions reached well-founded and a reflection of reality? The validity of a measurement tool (for example, an exam we use in education) is considered to be the degree to which the tool measures what it claims to measure. In research design and conduct, validity refers to whether a study is able to provide accurate answers to the questions it set out to ask. In clinical fields, the validity of diagnostic tests and of any diagnoses reached relate to the extent to which the findings and resulting recommendations can be trusted.

- **Values-based recruitment:** – definition to be added
- **Video Recording Review:** (see also, Debriefing)– definition to be added
- **Webinars:** (sometimes, but not fully accurately, called webcasts): This is a general term that tends to be used for various types of internet-based (web-based) conferencing and learning. In health professions education the term "webinars" usually implies some form of web-based seminar, in which one or more presenters introduce, explain and/or illustrate a topic area and the remotely-located, online attendees may be invited to ask questions and offer comments. Depending on the technology used to support the event, the process may vary from situations in which the audience is passive and only hears the presenter(s)' voice and sees static slides, to those situations in which the presenter is both seen and heard, and the remote audience can participate in one or more ways, including: sending text-based messages, being heard speaking, or being seen and heard in live video. As in conventional health professions education, many webinars remain dominantly one-way forms of communication, resembling the large-class lecture format more than an interactive seminar. The terminology related to these relatively new types of events remains inexact.
- **Workup: (see** Diagnostic workup**)**

Characteristics of optimal 21st Century Doctors

We are designing iMEdTrust's education programs to ensure that the graduates from all of our partner medical schools, including our initial "pathfinder" campus (iNSoMed), have the personal and professional foundation needed for becoming doctors (and other health professionals) who:

- **Are competent** in the disciplines needed for effective, contemporary clinical practice, appropriate for the contexts in which they work;
- **Understand and value** different healthcare professions and disciplines, with particular emphasis on being equipped to provide primary care that is inter-professional, collaborative, mindful, and integrates patients as core contributors to decision-making to the maximum extent feasible;
- **Are able to**, and choose to, engage in long-term, open, empathic, compassionate relationships with patients and their families;
- **Are able to earn** and sustain the trust of patients, colleagues, students, and others;
- **Are comfortable** communicating with, and being constructively helpful to people from a wide variety of language, cultural, religious, educational, and values backgrounds;
- **Are committed to** contributing to the care of the medically underserved, in both advantaged and disadvantaged communities, locally and internationally;
- **Understand** and respond appropriately to resource scarcity in healthcare delivery;
- **Are equipped to assess**, adapt, and adopt worthy healthcare innovations;
- **Provide care** that prioritizes health promotion, disease prevention, and focusses on establishing healthy habits. It is oriented to individuals, families and communities;
- **Are able to** respond appropriately to "unfiltered" (non-preselected, non-referred) patients;
- **Adapt comfortably** and constructively to ambiguity, uncertainty, and complexity;
- **Are committed to** and have the skills needed for being effective, eager, mindful learners throughout their careers;
- **Are routinely** reflective and capable of reasonably accurate self-assessments, seeking to be alert to their own strengths and limitations, and ready to recognize and seek help when needed;
- **Remain committed to** devoting time and effort to supporting the learning of students and less-experienced colleagues throughout their careers, and are skilled at doing so;
- **Choose to exert leadership**, serving as constructive change-makers in their communities, as needed, within the range of their capabilities for doing so.

iMedTrust's Education Manifesto

Our central purposes (mission):

- Enlarging the world's capacity for educating medical doctors (and other health professionals) who are optimally prepared for 21st century practice, especially in and for low resource, underserved areas
- Continuing professional development for practicing health professionals
- Researching and enhancing the processes, content and context of health professions education.

We value:

- Reflective, mindful, active learning *over* rote learning
- Empathic collaboration *over* control
- Continuous adaptation *over* automatic preservation of traditional practices
- Curiosity and openness over certainty and dogma.

We're persuaded that high quality health professions education requires:

- Highly prepared educators, who:
  - are role models who exemplify empathy, scientific thinking, and professionalism
  - are effective listeners, humble, mindful and collaborative
  - earn and sustain the trust of their learners
  - are highly effective listeners
  - respond appropriately to each learner's uniqueness
  - are dependable, non-judgmental advocates for their students
  - have high standards for education and for health care
  - appreciate the humour in life and learning.
- Highly motivated learners, with a commitment to serving others.
- An institutional culture that is consistently characterized by:
  - Caring, compassionate, trust-based relationships
  - Collaborative relationships between and among all parties
  - Respect for and appropriate responses to each person's uniqueness
  - Continuous analysis and refinement of the educational process
  - Continuing, constructive adaptation to changing circumstances.
- A program that reliably produces graduates who:
  - adapt constructively to changing and unanticipated circumstances
  - are systematic, highly effective, lifelong learners
  - earn and sustain the trust of their patients
  - dedicate themselves to service and the highest standards of practice.