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The role of ICT in the PYP

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This document clarifies the role of information and communication technologies (ICT) in IB World Schools offering the Primary Years Programme (PYP), and should be read in conjunction with *Making the PYP happen: A curriculum framework for international primary education* (2009).

Beliefs and values about ICT in the PYP

The ever-increasing impact of ICT on teaching and learning is an important consideration in education at all levels. Through ICT, there are greater opportunities for interactive communication and exchange of information through global collaboration, authentic learning, expansion of the learning community and empowerment for all learners.

ICT in the PYP encompasses the use of a wide range of digital tools, media and learning environments for teaching, learning and assessing. ICT provides opportunities for the transformation of teaching and learning and enables students to **investigate**, **create**, **communicate**, **collaborate**, **organize** and **be responsible** for their own learning and actions. ICT allows students to make connections and reach a deeper understanding of its relevance and applicability to their everyday lives. Through the use of ICT, learners develop and apply strategies for critical and creative thinking, engage in inquiry, make connections, and apply new understandings and skills in different contexts.

In this constantly evolving digital age, ICT is progressively becoming a ubiquitous part of a learner's life at school and beyond: for learning, working, innovating, creating, responding, problem-solving, problem-posing, socializing and playing. Students inhabit a world saturated with information, images and sound. Inevitably, students' immersion in this world continually leads them to explore creative and innovative uses of emerging technologies beyond their basic functional applications, discovering new ways of engaging with content meaningfully, and participating fully in today's world.

The IB learner profile is integral to teaching and learning in the PYP because it represents the qualities of effective learners and internationally minded students. The learner profile, together with the five essential elements of the programme—concepts, knowledge, skills, attitude and action—inform the integration of ICT in planning, teaching and assessing in the PYP.

The role of ICT in a transdisciplinary programme

In the PYP, it is advocated that purposeful inquiry is the best way to learn. The starting point should always be students' prior experiences and current understanding. When teachers plan learning experiences that enable students to develop, students are able to make connections, apply their learning, and transfer their conceptual understanding to new situations. This progressive conceptual development, together with an enjoyment of the process, provides the foundation for lifelong learning.

In the PYP, there will be opportunities to use ICT in the relevant, authentic context of the units of inquiry, as well as through teaching and learning experiences in other areas of the curriculum. Teachers have a responsibility to help students to make explicit connections between different aspects of their learning. Students need opportunities to identify and reflect on significant ideas within the different skills of ICT, the transdisciplinary themes, and other subject areas. The role of ICT to support inquiry is important as students engage in building understandings that contribute to their success as lifelong learners in a digital age.

To ensure a cohesive educational experience for students, a PYP school is responsible for ensuring that there are regular opportunities for collaboration among teachers in the school including homeroom/classroom, single-subject and support teachers (for example, teacher-librarian, ICT teacher, learning and/or special needs teacher). This collaboration includes the development and overall review of the school's programme of inquiry, as well as planning, teaching and reflecting on individual units of inquiry. However, it should be recognized that the responsibility for learning about and through ICT is shared among all teachers. It is acknowledged that in many schools, a single-subject teacher takes responsibility for ICT. It is vital that these teachers see themselves primarily as PYP teachers who teach and integrate ICT throughout the curriculum, and in so doing contribute to both the broad and specific learning outcomes of a transdisciplinary programme.

It is worthwhile to note that there will be opportunities for student-initiated, spontaneous inquiries into the use of ICT that are not directly related to any planned units of inquiry or single-subject areas. For example, a student contributing to a class blog may want to start his or her own blog as a personal reflection journal. These are valuable teaching and learning opportunities in themselves, and provide teachers and students with the opportunity to apply the pedagogy of the PYP to authentic, of-the-moment situations.

ICT skills for inquiry

The effective integration of ICT enhances the learner's opportunity to connect globally and to explore different perspectives in order to understand evolving cultural and social norms. The following list of ICT skills provides the whole school community with a structure for using ICT as a tool for learning. It has been designed in recognition of the fact that learning is a series of feedback loops involving the individual, the group and the local or global environment. All teachers working with PYP students will find that the ICT skills will be relevant to the transdisciplinary programme of inquiry as well as to subject-specific inquiries.

ICT includes a variety of approaches to help connect learners within both the local and global community in order to empower learning. Learners' awareness, use and appreciation of different ICT knowledge, skills and platforms should be developed. Furthermore, students should be encouraged to recognize that competency in ICT is a valuable life skill.

The following six ICT skills are relevant to all learners: investigating, creating, communicating, collaborating, organizing and becoming responsible digital citizens. Each skill is transdisciplinary and will support learning both within the transdisciplinary programme of inquiry and within the subject areas. These skills interact with each other to support the development of learners. Therefore, teachers should consider these skills when planning for teaching and should look for evidence of them in student learning.

Investigating

Investigating is to carry out a purposeful inquiry or research, to test existing understanding, discover new information and create new understanding. Through investigation, learners critically evaluate a variety of sources, making connections and synthesizing findings to apply knowledge to real-life contexts.

Creating

Creating is a process through which learners are provided with an opportunity to innovate and test boundaries. Learners construct meaning, apply critical thinking and original ideas to real-world situations, and share knowledge through self-expression, problem-posing and problem-solving, and reflection.

Communicating

Communicating is the exchange of information with various audiences using a range of media and formats. Effective communicators contribute to cross-cultural understanding, make informed choices when deciding on tools to articulate meaning, and provide relevant, significant feedback to others.

Collaborating

Collaborating is the process through which learners validate and negotiate ideas and reach a deeper understanding and a global perspective. Learners are empowered through digital media and environments and through active participation in creating and sharing knowledge.

Organizing

Organizing is the ability to structure or arrange connected items. Learners understand that ICT systems can be used to inform, adapt, manage and problem-solve during their creative, communicative, collaborative and investigative processes. Learners make connections, transfer existing knowledge and independently explore new technologies.

Becoming responsible digital citizens

Becoming a responsible digital citizen involves using ICT to make informed and ethical choices while acting with integrity and honesty. In a globally connected digital world, learners are empowered to be responsible for their actions, to value others' rights and to practise safe and legal behaviours.

The suggested ICT skills above are not an added layer to the existing PYP skills as documented in the *Making the PYP happen: A curriculum framework for international primary education* (2009). Rather, they reflect the IB learner profile and the five essential elements of the PYP—concepts, knowledge, skills, attitudes and action. The ICT skills have a role to play in all these aspects of the PYP curriculum model: the written, taught and assessed curriculums. In particular, the ICT skills listed should be cross-referenced with the five transdisciplinary skills defined in the PYP: thinking, social, communication, self-management, and research skills. The ICT skills defined in this document should be seen as supporting and contributing to the existing PYP essential elements.

Good ICT practice

ICT is one of the connecting components throughout the curriculum. As students engage with ICT across and between the transdisciplinary themes and subject areas, they come to a deeper understanding of its relevance and applicability to their everyday lives. Appropriate attitudes and behaviours concerning the use of ICT are also modelled within the school community.

In a PYP school, the focus of ICT is not only on the use of technology for its own sake, but to enhance learning throughout the transdisciplinary programme of inquiry, across the subject areas, the IB learner profile, and the essential elements of the PYP. It is clearly a transdisciplinary strategy. The understanding and effective use of ICT has moved beyond simply mastering a specialized set of skills and tools: ICT has become a vehicle for learning skills and concepts and their applications within meaningful contexts. The role of the school and teacher is to create authentic learning engagements through the provision and use of ICT. This learning can happen in a physical or a virtual environment, and is likely to occur when needed or "just in time".

All teachers are responsible for using ICT to its best effect throughout the curriculum. This integrated approach, to support teaching and learning using ICT, provides opportunities for consistent and coordinated practice that can be communicated, understood and undertaken by the whole school. In this way, all stakeholders may function as partners in education, making learning more relevant and enduring for the student. In order for effective integration to take place, the school needs to plan collaboratively what form this integration will take, guided by the school's beliefs and values about ICT and the PYP stance on how students learn best.

Teachers' competence in the use of ICT is of key importance. What experiences teachers have had will shape their choices of resources, the learning experiences they design and how effectively they are able to support the development of each student's understanding. Teachers' interest in, and development of, ICT should be

maintained through regular professional development, reading of professional journals and regular contact with educators in professional learning networks who share their commitment to the integration of ICT in the curriculum.

Teachers can use the eight PYP key concepts—form, function, causation, change, connection, perspective, responsibility and reflection—to guide their own inquiries. By engaging in inquiry themselves, teachers will achieve a deeper understanding of the role ICT plays in learning and in society, and will also be models for their students by demonstrating that they too are learners.

ICT in a PYP school should be about more than using hardware and software. Its purpose should be to develop a combination of transferrable skills and understanding so that students can actively participate in a digitally connected world. Schools should be aware that many students are confident users and explorers of ICT. Teachers should find out what students already know and can do so that they can teach appropriate knowledge and skills and develop students' understanding. This will enable the students to be discerning producers and consumers of content and tools. Therefore, ICT should support specific learning opportunities such as:

- investigating and carrying out a purposeful inquiry

- creating and innovating

- communicating and exchanging information with varied audiences using a range of media and formats

- collaborating by actively participating in creating and sharing knowledge

- organizing and understanding that ICT systems can be used in various ways

- becoming responsible digital citizens who make informed and ethical choices, while acting with integrity and honesty.

The school's pedagogical leaders play a vital role in the successful use of ICT throughout the curriculum. The effective use of ICT in teaching and learning will have a profound impact on schools in areas such as resourcing, staffing, professional learning, classroom structures and the definition of the learning community. Preparing PYP students for today's and tomorrow's world by enhancing teaching and learning through ICT will depend on the support and, more importantly, the understanding and involvement of the school's leadership team.

A PYP classroom can be connected to the broader world through ICT. Students research and communicate not only through printed media but also through global electronic networks in order to access a vast range of multimedia resources. ICT provides a platform for learners to engage with the world and, in an IB World School, to relate to, and accept responsibility for, the mission of the IB to "help to create a better and more peaceful world". Through ICT, students learn what it means to be a participant in a global community, to be digitally responsible and to make informed reflective decisions.

How ICT practices are evolving

The PYP represents an approach to teaching that provides a context within which a wide variety of teaching strategies and styles can be accommodated, provided that they are driven by a spirit of inquiry, promote conceptual development and have a clear sense of purpose. Structured, purposeful inquiry is the main approach to learning about, and learning through ICT in the PYP.

The degree of change needed to integrate ICT both for and through inquiry will depend on individual teachers' understanding of the role of ICT in the PYP, school policies and resources, and collaboration among teachers. Teachers should engage in reflection on their own practice, both individually and in collaboration with colleagues, with a view to sharing ideas and strengths, and with the primary aim of improving their teaching to improve student learning. In doing so, they will be modelling the skills and attitudes that have been reflected in the IB learner profile.

As an aid to reflection, the following set of examples of good ICT practice has been produced. It is believed that these examples are worthy of consideration by anyone committed to continual improvement of practice.

Increase emphasis on:	Decrease emphasis on:
concept-driven and transdisciplinary teaching taking place both inside and outside the programme of inquiry	teaching an isolated subject or topic
using ICT to investigate, create, communicate, collaborate, organize and be responsible digital citizens	learning ICT as a series of skill sets for their own sake
authentic embedding of ICT across the curriculum	stand-alone ICT lessons
viewing teachers and students as collaborators in the learning process	viewing the teacher as the sole deliverer of skills and knowledge
providing opportunities for student choice to encourage students to take responsibility for their learning	using specific ICT tools exclusively for particular tasks
learning as part of a broader community of learners	learners learning in isolation as a dominant feature
adapting multiple systems or approaches (for example, platform or application) according to the situation and needs of learners	reliance on one system or approach (for example, platform or application)
collaborative planning and reflection	planning for ICT instruction in isolation
professional learning as a continual process	professional learning as a one-time event or opportunity
professional learning provided within authentic contexts	stand-alone professional learning
learning beyond the classroom through global connections	learning restricted to the classroom or ICT lab
management of ICT resources to meet educational goals	management of ICT resources without strategic planning
publishing content for an authentic audience, for example, using social media tools to communicate a message to a wider group of people.	printing student work for display on the school bulletin board only.

Developing an ICT policy: A sample process

A PYP school community should collaboratively identify and agree on the need for, and aims of, the use of ICT. To this end, schools may want to consider the development of a policy or an agreement that defines their beliefs and values, as well as operational guidelines in relation to ICT. This should reflect the mission of the IB and that of the school, and be reviewed regularly to reflect the constantly changing nature of learning and ICT. It must be communicated effectively to all stakeholders. All school decision-making related to ICT should be guided by the school's ICT policy.

Every school exists within a different context, which must be taken into consideration when the school determines how best to develop and improve its ICT policy.

The following organizational process is a sample that schools may choose to follow or adapt in order to develop and strengthen their own ICT policy.

Stage 1: Form an ICT committee

Different stakeholders in the school community could be members of an ICT committee. However, it is essential that the pedagogical leaders of the school are members of this committee as they are responsible for the effective management of resources (people, time, equipment and money).

Stage 2: Conduct an ICT review

The committee should conduct a strategic review of the current state of ICT at the school, including:

- ICT philosophy
- the role of ICT to support teaching and learning
- the position of ICT in the curriculum
- organizational structures and staffing
- management practices
- resources and budget
- professional learning
- existing policies and procedures.

Stage 3: Define beliefs and values

The committee should collaboratively develop a document that defines the school's beliefs and values, as well as operational guidelines, in relation to ICT. This should be aligned with the IB's mission statement and the ICT belief and value statement as represented in this document. While engaging with this process, the following questions may facilitate discussion.

- What role does ICT play in developing the essential elements of the programme and the attributes of the IB learner profile?
- What does the integration of ICT across the curriculum look like?
- What does the school believe is an adequate provision of resources?
- How will ongoing professional learning in the use of ICT be valued in the school?
- What are the different roles and responsibilities of members of the school community with respect to ICT provision and use?

The committee should obtain feedback from the school community about the draft document and use this input to make revisions as needed.

Stage 4: Develop an action plan

The committee should develop an action plan with clear goals and strategic processes to meet the needs outlined in the school's beliefs and values about ICT document. While developing this plan, the following questions should be taken into consideration.

- How does the school's ICT policy make the ICT skills operational (for example, investigating, creating, communicating, collaborating, organizing and becoming responsible digital citizens)?
- How can ICT be used to enrich and differentiate learning experiences?

- What ongoing professional learning in the use of ICT will be provided for staff?

- How will the school evaluate the effect of ICT on learning?

- What types of organizational structures are needed to support effective and authentic provision and use of ICT across the curriculum?

- What sustainable management practices (for example, ongoing professional learning, hardware replacement) will make the school's beliefs and values about ICT operational?

The committee should obtain feedback from the school community about the action plan and use this input to make revisions as needed.

Stage 5: Implement

The committee should establish a timeline for implementation and ongoing review of the action plan and communicate the plan to the school community.

Learners of today and tomorrow

The IB offers schools programmes that promote the development of "inquiring, knowledgeable and caring young people who help to create a better and more peaceful world through intercultural understanding and respect". The emergence of educational technologies has transformed how IB World Schools achieve this mission.

In particular, the internet, one of the greatest technological innovations in the last 50 years, facilitates the finding and creating of information, as well as building and maintaining relationships and communities. Students of today are raised in a connected world and their immersion in wired technologies contributes to the evolution of learning in digital spaces. A new dynamic educational landscape has emerged. It is, therefore, critical that students' awareness, use and appreciation of different kinds of information, skills and platforms should be developed both at school and at home. The school community should be engaged in a dialogue to ensure a positive educational experience by understanding how to use the internet and web-based devices safely, responsibly and smartly.

> The work done by curriculum developers of this document was undertaken without prejudice, in that the review work was not a deliberate attempt to align with PYP core documents. Consequently, it is particularly interesting to note that the ICT skills defined in this document are reflected, either explicitly or by extension, in the PYP transdisciplinary skills listed in *Making the PYP happen: A curriculum framework for international primary education* (2009).

Samples

A range of related sample materials aimed at illustrating how PYP schools view, consider, and plan for ICT in their school can be found in the HTML version of this publication. The IB is interested in receiving more related sample materials, in particular materials that show how schools are using information presented in this publication to support teaching and learning. Examples of materials include:

• ICT policies

• planners where ICT skills are used to support inquiry

• planning documents that show the connection between ICT and the curriculum

• job descriptions outlining the role of the ICT teacher in a PYP school.

PYP schools willing to share their work should send these materials to a wiki that has been set up to support this publication, http://ict-pyp.wikispaces.com/, or to pyp.curriculum@ibo.org.

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