Interactive Classroom Working Group

School strategies for fostering students' digital competences

Practical guidelines for school leaders

Case Study

CSVR - Cercle scolaire de Val-de-Ruz · Switzerland

European Schoolnet

Future Classroom Lab

Case study: CSVR - Cercle scolaire de Val-de-Ruz, canton de Neuchatel, Switzerland
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Introduction

School digital strategies refer to the plans and frameworks developed by educational institutions to effectively integrate digital tools, technologies, and practices into the learning environment. Sustainable and inclusive digital education strategies require a balanced approach that considers diverse learner needs and promotes equitable access to technology. Rather than simply integrating new technologies in school practices, effective digital education strategies require a well-considered idea of how technology can improve educational outcomes, address inequalities, and support the wider educational mission of the school. It is a continuous process of identifying key priorities, allocating resources for targeted initiatives, monitoring progress, and achieving the different objectives.

This case study is one of 15 developed from interviews with members of school leadership teams who have contributed to the development of effective, sustainable, and inclusive school strategies to foster students' digital competence. The case studies focus on strategies that have successfully improved digitalisation of school and teaching practices and supported the development of digital competences in their students, in a sustainable and inclusive way. The schools are located in eight countries i.e. Czech Republic, Ireland, Italy, Luxembourg, Portugal, Serbia, Slovenia, and Switzerland. The interviews were part of research carried out by European Schoolnet's Interactive Classroom Working Group on the schools' experiences, the lessons they have learnt and the good practice they have developed. This research has informed the development of the publication 'School strategies for fostering students' digital competences. Guidelines for school leaders'. Find the publication and other case studies here: https://fcl.eun.org/icwg

Context

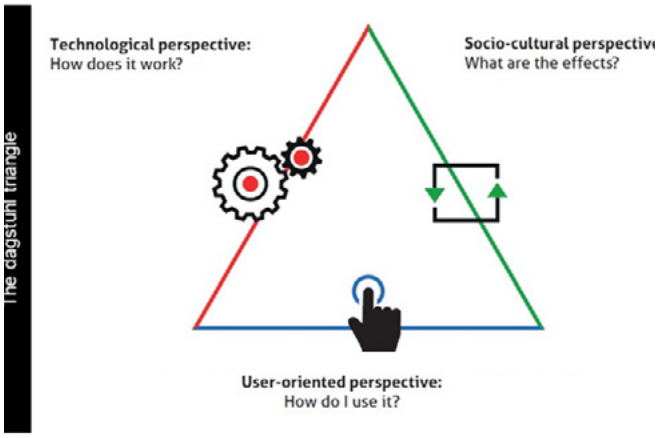
As a multilingual federal state, Switzerland is characterised by significant cantonal autonomy and a decentralised organisation of schools. While professional schools (vocational training) and federal universities of technology are managed at the federal level, compulsory education (primary and lower secondary) is primarily the responsibility of the 26 cantonal ministries of education. With a few exceptions, the cantons and municipalities organise the running of schools and finance 90% of public spending on education.

To ensure effective collaboration and coordination between the cantons and with the Confederation, there are inter-cantonal government bodies such as the CDIP/EDK at the national level, the CIIP for French and Italian speaking cantons, and three regional conferences for the German-speaking cantons. These bodies enact directives to address current educational challenges and produce guidelines to support the digital transformation of schools, including the EDK's 2018 Digital strategy and measures, which cover topics such as digital curricula, infrastructure, teacher training and support for school heads.

The regional conferences oversee the three regional curricula. The German-speaking cantons introduced their digital curriculum Media and Informatics in 2017 and have been training teachers to implement it ever since, partly through shared online content, namely the MIA Modules. The French-speaking cantons updated their previous digital curriculum in 2021 to include computational thinking and informatics. Digital education is now compulsory, with learning objectives set from the early years onwards. The curricula are built around the same concept of how technology use, media understanding, and computational thinking should be taught in an interconnected manner.

The curricula's overall goal is to enable pupils to use media safely, creatively and responsibly, while also giving them their first insights into computer science. Whereas curricula, learning resources and teacher training concepts are coordinated, investment in infrastructure generally remains the responsibility of local authorities. Historically, IT was considered an integral part of a school building, which by law is financed by local authorities, so harmonising infrastructure (interactive screens, computers for staff and pupils, tablets, etc.) has been very challenging.

Similar diversity is observed regarding the requirement for digital strategy documents from schools. While some cantons and local authorities encourage schools to develop a digital strategy, for example the canton of Zürich with its ICT Guide, such documents are rarely produced (and kept up to date) in Swiss schools. Postgraduate training programmes for school heads now include modules dedicated to developing a digital strategy as a means of guiding a school's digital transformation, so awareness and know-how are growing.



Source: beat.doebe.li/talks/europarat19/sld008.htm

Canton of Neuchâtel

In response to the introduction of new digital and informatics curricula in both mandatory and upper secondary education, the canton of Neuchâtel commissioned a study to evaluate the state of digitalisation in its schools. The 2019 report identified substantial gaps, particularly in infrastructure, teacher training and curriculum implementation. In the absence of a robust cantonal framework, isolated initiatives had developed, leading to disparities in the digital competences of both teachers and students. The report underscored the urgent need to equip students with a common foundation of digital knowledge, including technical skills, critical thinking regarding digital content and responsible digital citizenship, to adequately prepare them for further education.

Based on the report's findings, the parliament approved a significant budget for a programme covering both mandatory (primary and secondary) and post-mandatory (vocational and academic) education levels. The programme prioritises the integration of digital education across various subjects, offers specialised courses on digital literacy beginning in the final two years of primary school, and focuses on teacher training, infrastructure improvements, thereby establishing a solid regulatory framework, and promoting the sustainable use of digital tools to minimise environmental impact. As is often the case in Switzerland, a disproportionate share of this funding was allocated to upper secondary schools.

To train its educators, the Department of Education has selected experienced teachers to develop training modules, in part drawing on the resources and expertise cultivated through the canton of Vaud's large-scale digital initiative (refer to the Le Mont case study for further details). However, due to budgetary limitations, compulsory training for regular teachers is relatively minimal—typically comprising only two or three afternoon sessions. Teachers assigned to teach digital education lessons (with a focus on computational thinking and informatics) at the end of primary and throughout secondary school, receive more extensive training. To embed this continuing professional development into everyday teaching, each school district has allocated release periods for members of the digital education resources team (REN or digital education coordinator).

Regarding artificial intelligence, the canton is still deliberating on how best to navigate this emerging field. It has organised several conferences and webinars for its teachers, although no formal guidelines have been established yet.

The school

School 1 - CSVR primary Dombresson

Located in the Jura Mountains, roughly 20 kilometres from the town of Neuchâtel, the Val-de-Ruz is a rural area which in recent years has attracted many families who commute to Neuchâtel for work. While the population is growing, it remains relatively homogeneous, with 13% of residents being foreign-born (compared to 30% for Switzerland overall).

In accordance with cantonal laws, which grant local authorities considerable control over education, the Department of Education in Neuchâtel has regionalised its school system. The Val-de-Ruz school district (CSVR) comprises 13 village primary schools and one large middle school in Cernier, all overseen by a single leadership team. 250 teachers (including teaching assistants for pupils with special needs) serve 2,200 pupils from Year 1 to Year 11, supported by three educational social advisers, two librarians and a school doctor. The district's geographical dispersion presents a challenge in fostering a strong sense of community within the team.

Although the CSVR is legally obliged to adhere strictly to the Romandie curriculum, le plan d'études romand, it places a strong emphasis on cross-disciplinary skills and interdisciplinary projects, particularly in the areas of wellbeing (social skills, empathy) and sustainability.

The relationship between the school and local authorities is close but complex at times, as much of the school's funding relies on the authorities'

understanding of its needs and projects. While local authorities take pride in the school's good reputation, they do not always fully grasp its broader ambitions when these go beyond traditional schooling models.

Consequently, the management team must pay special attention to communication and submit detailed proposals and reports to secure the necessary resources for the school's effective operation.

School 2 - CSVR Secondary Fontanelle

Why this school as a case study?

Despite its relatively remote location and modest resources, the Val-de-Ruz school district has been a leader in education since its establishment in 2012. Step into any of its 14 school buildings, and you'll immediately notice a spirit of experimentation and innovation. In primary schools, most classrooms boast flexible learning spaces with colourful tables and varied seating arrangements. While secondary school classrooms retain a more traditional look, the corridors and staircases are adorned with student art and feature ping-pong tables. The soft-spoken headteacher, Fabrice Sourget, who has led the district since its inception, is deeply committed to pedagogical innovation and has a clear vision for the future of the school. The district's motto, Nous travaillons pour ce qui nous grandit ('We work for what helps us grow'), is prominently displayed on the website and throughout the school. The district's core values drive strong engagement in a healthy and caring school environment: creativity, citizenship and sustainability.

Sourget views inclusion, the diversification of learning paths, and digital transformation as the school's key challenges. He argues that the digital age compels a complete rethink of how knowledge is transmitted, with the availability of information reshaping the teacher's role. 'Knowledge is no longer centred on one person (the teacher) but can be accessed anywhere and at any time... This changes the teacher's role from imparting knowledge to guiding students, standing by their side.' Technology is a means to an end, with computers and pools of tablets facilitating a variety of projects.

For Sourget, the response to these challenges lies within each individual institution. As a district that follows pupils throughout their compulsory education, the CSVR is well structured to embrace change head on: 'Our organisation makes it possible to develop projects coherently and across the various levels of primary and secondary school — from the 1st to the 11th year ... We can act on our own classrooms, change our own environments. The laws are sufficiently vague to allow for experimentation. I operate on the principle that the only limits we face are those imposed by our own habits.'

School leadership team

The school's management team consists of one director and 4 deputy head teachers assigned to particular key stages. The team is highly receptive to new ideas and actively pursues a variety of initiatives that bring project funding and invigorate the school community. Through Mr Sourget's

involvement in a variety of intercantonal and national education networks, the school remains informed of emerging projects. For example, it currently participates in the sport campus initiative to foster perseverance through sport, in an arts academy that develops cross-disciplinary skills and self-worth through collective artistic practice and in an outdoor education network.

The school's digital objectives are overseen by the digital team, or CONUM, which is coordinated by the secondary deputy head and is made up of 7 teachers from different key stages who receive time off to serve as technology coordinators. Two of them are also involved in the canton's teacher training initiative which gives them a more systemic view of current regional priorities. The CONUM team meets 9 times a year, with the deputy head reporting directly to the school's leadership team. The group discusses the projects and needs put forward by teachers and determines how best to allocate resources, but much of their time is taken up by making sure the infrastructure and devices work for teachers and their students. Twice a year, the team publishes a small digital tips and projects newsletter with straightforward, hands-on advice.

Vision-values of the school digital education strategy

The Val-de-Ruz's management team has developed an overall 5-year development strategy, which encompasses digital transformation. At the start of each academic year, the deputy reviews the projects and objectives, and measures progress with the teaching teams. Teachers can express their opinions on the school's strategy, assess its relevance and indicate their satisfaction through an annual online questionnaire.

Within the overarching strategy, the digital objectives are twofold: first, to promote an understanding and mastery of modern tools, ensuring that everyone can engage with the world in a responsible and critical manner; second, to integrate digital technologies to support differentiation and accessibility for all pupils with special educational needs. As digital technology presents both opportunities and risks, the school's role is to provide guidance, particularly through awareness-raising and preventive measures.

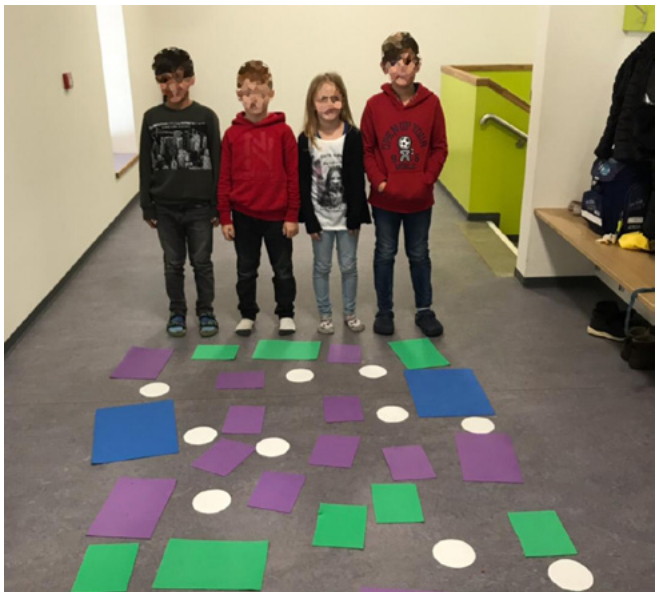
Unlike many schools with successful digital strategies where progress is often attributed to a charismatic technology coordinator or a top-down approach, the CSVR thrives due to its open and collaborative management which fosters innovation from the ground up. In his role as head teacher, Mr Sourget empowers teachers to change their methods of working, reminding them that they have the freedom to do so and encouraging them to question their practices.

There is no formal strategic document that details the specific planning of purchases or training initiatives as this would contradict the school's bottom-up approach. Instead, the aim is to empower teachers to initiate their own projects in response to the educational challenges they encounter in their classrooms. Once a project begins, it is nurtured with the appropriate support and resources, and help is sought to scale innovation, for example from researchers or foundations. Thierry Vauthier, the teacher who started the flipped mastery class (see below), mentioned how resources are not an issue when a project makes sense pedagogically. Despite the school's limited means, Mr Sourget will work in the background to make sure the project can be implemented.

Shifting teachers' attitudes and mindsets about technology while simultaneously ensuring their wellbeing is a long-term challenge and requires careful balance. The secondary school deputy and head of the digital leadership team, Mr Krebs, likened the spread of innovation to capillarity—progress is gradual and organic. No teacher is forced to change their pedagogical methods, but pioneering teachers know they have the leadership's full support in their endeavours. They are encouraged to share their expertise, with the hope that these ideas will naturally spread over time.

The CSVR excels in documenting its ongoing projects, in mobilising available resources and communicating about them to a wider audience. This would not be possible without a coherent underlying strategy, even if it has not been explicitly formalised.

Focus-aims



Over the past decade, the CSVR has witnessed the emergence of several digital education initiatives that have enriched its broader educational vision. Two projects stand out.

In the primary classes, a group of teachers developed an innovative methodology to teach key areas of digital literacy through unplugged activities. This initiative, known as the Beyond Traditional Teaching Methods: Organising Classroom Work through an Introduction to Computational Thinking project, has significantly shaped how digital education is taught since its launch in 2014. Teachers have embraced a variety of unplugged activities, enabling children to grasp essential computer science concepts—such as understanding machines, algorithms, programming, and to evaluate the veracity of information—through play. Awarded the Spotlight Award in 2019, the project goes beyond merely teaching digital education; it reimagines how teaching is organised.

At the secondary level, a maths teacher has reorganised his teaching around the concept of flipped mastery. This concept combines the principles of the flipped classroom and of learning for mastery (B. Bloom, 1968). The pillars of this pedagogical approach are described below.

- Flipped mastery relies heavily on digital tools and resources to establish a decentralised learning environment that promotes active and differentiated learning tailored to each student's pace, needs, and choices.
- Teachers provide a variety of differentiated teaching materials, selected or created by the teachers themselves. They structure and validate their students' learning paths and assist them with their organisation.
- Students work in small groups or individually, according to their preferences and at their own pace. If they quickly understand a lesson, they can move on; if a topic is challenging, they can pause or revisit it without shame or holding back the rest of the class.
- Assessment practices shift from summative to formative to provide students with ample feedback and monitor their individual learning progress; remedial support is offered if the student desires.
- The learning environment is flexible, and grants students control over how they organise their time and space, thus fostering autonomy.

Although implementing flipped mastery was initially challenging, Thierry Vauthier's teaching has now become smooth, effectively managing diverse abilities which fosters more autonomous and motivated learners, and increases student-teacher interaction.

Infrastructure and funding

In the schools of the canton of Neuchâtel, funding for digital equipment and devices is a shared responsibility between local authorities and the canton itself. The canton oversees the selection and distribution of a limited number of standard computers, ensuring that each primary school classroom is equipped with three PC computers. The large middle school in Cernier, serving approximately 700 students, boasts three multimedia labs with 24 computers.

Over time, the school has acquired numerous iPads with its own budget. Initially the devices were part of a project aimed at introducing innovative evaluation methods by collecting students' digital traces. Subsequently, the iPads have been utilised to support students with special educational needs or made available to classes working on specific projects. In the middle school, students are also permitted to use their mobile phones as reference tools.

While some Swiss schools have invested heavily in one-to-one device programmes, this is something Val-de-Ruz does not aspires to. The approach would be misaligned with the core values the school aims to promote, i.e. collaboration, wellbeing and sustainability.

Role of AI and other emerging technologies

Considering the CSVR's priorities and modest budget and the canton's mainstreaming strategy, it is evident that the digital team does not dedicate much energy to purchasing and testing the latest digital trends, particularly in costly areas such as virtual and augmented reality or maker technologies. The school possesses a few 3D printers which are used in very specific contexts. However the local school of education has set up a variety of TestLabs to allow for such experimentations. Although these labs welcome technology coordinators and interested teachers with their classrooms, they have remained a niche offering up until now.

The widespread public access to generative AI since December 2022, on the other hand, has captured the leadership team's full attention. They quickly shared their discoveries, discussed them with the teaching staff and offered training sessions. The team believes it is important to make teachers aware of the need to reframe tasks and rethink homework to take these tools into account, particularly at the secondary level.

On the other hand, teachers employing flipped mastery—who would particularly benefit from these tools for tasks like creating teaching resources with adapted language levels—have not yet had sufficient time to fully explore their potential. Adaptive learning platforms currently being developed for French-speaking learners, such as EvidenceB for mathematics, could also be relevant in this mastery context, as they analyse students' learning data and provide visual dashboards to support effective differentiated learning.

Added value and impact

At present, the CONUM's efforts are focused on the rollout of mandatory digital education training, organised for all teaching levels from 2022 to 2026. The aim is to equip all teachers with a common foundation of basic competences and prepare them to implement the digital education curriculum. A large-scale initiative of this kind should somewhat reduce the inequalities identified in the 2019 report. More broadly, the school's leadership team has gathered evidence that innovative, technology-enabled methods can offer solutions to current educational challenges. The 2014 Beyond Traditional Teaching Methods: Organising Classroom Work and an Introduction to Computational Thinking project demonstrated how digital education can go hand in hand with new forms of teaching and learning. As Mr Sourget observes, this initiative showed that the organisation of classroom work should evolve to enable the integration of digital education. Flexible classes and workshops allow teachers to adopt new roles; they are no longer facing the children but standing beside them, observing them to better understand their needs. Through unplugged activities, pupils can formulate

hypotheses, anticipate outcomes and evaluate their own assertions. The digital world demands the development of critical thinking skills.

The more recent Flipped Mastery project is still in its early stages, but the results are extremely positive. The project initiator, Thierry Vauthier, is now able to step back and share his experience with colleagues and future teachers, with the hope that this approach can be extended to more secondary school classes.

When generalising a flipped model, providing sufficient learning and teaching resources for differentiation is always a challenge. For over ten years, the canton of Neuchâtel has been building an extensive digital resource platform—https://iclasse.rpn.ch/parcours/libre—which supports the development of individualised learning pathways.

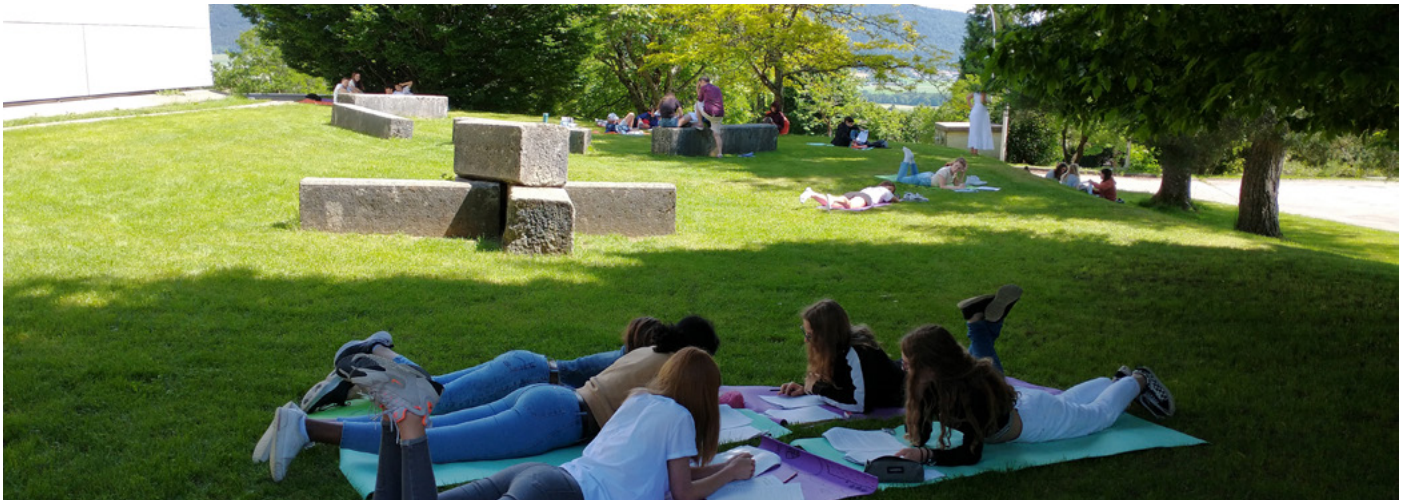
Challenges

After more than a decade of exploring educational innovations through various teacher-led initiatives, the Val-de-Ruz school district is now seeking ways to mainstream these innovations. Their goal is to ensure that as many students as possible benefit from these practices, all while prioritising teachers' choice of methodology and wellbeing.

Despite support from educational authorities, several obstacles persist: how can detailed system modelling be developed to progressively extend flipped mastery to all secondary classes? Furthermore, how can a school organise a large-scale decentralised learning environment while maintaining compliance with the curriculum and timetable approved by the State Council? For this approach to become widespread, parental support is also essential. For all these reasons, Fabrice Sourget describes the pace of innovation as steady but slow: 'We are still following a policy of small steps, trying to encourage teachers by presenting ideas and digital projects. No one is forced to embark on projects of this kind, and we focus our energy on those who are willing to evolve. In a second phase, the goal is to support those interested in joining the project.'

The integration of digital technology in education necessitates a reconsideration of the budget. As digital learning becomes an established subject within the curriculum and teachers increasingly utilise digital tools to personalise learning experiences, the need for professional tech support and infrastructure management has become unmistakable. Expanding mobile resources beyond the standard provision by the canton requires financial support from the local municipality to ensure sustainability. The leadership team is proactively collaborating with local authorities to secure funding for dedicated tech support across the district. This initiative aims to ease the burden on teachers currently acting as digital coordinators, enabling them to concentrate on guiding colleagues in implementing digital projects rather than handling technical difficulties.

The Val-de-Ruz school district is not immune to the anti-screen trend taking hold in schools across Europe, with parents and teachers challenging screen time at school. Nevertheless, the school's measured strategy—eschewing the ideological promotion of personal digital equipment for each pupil and placing a strong emphasis on the pupils'



overall wellbeing—should make it be more resilient to external pressures.

Sustainability and improvement of strategy

Spreading and scaling up innovative practices in a school is a dynamic process that depends on collaboration, support and a willingness to embrace change. By fostering a culture that values innovation, by providing resources and training connected to specific projects and by involving all stakeholders, the CSVR has much in place to effectively integrate new practices that enhance learning outcomes and prepare students for the future. Collecting more data on how practices and competences evolve over time, for example by means of a SELFIE assessment, could enable a more systematic and long-term mapping of available resources and skills development.

Regarding infrastructure, there is a need to secure initiatives over the long term. What happens after the cantonal initiative and its funding conclude is equally important. The hours allocated to support teachers in their digital practices are likely to be redirected to other projects. One can only hope that the efforts made since 2020 will be sufficient to guarantee the digital strategy's long-term sustainability.

For the CSVR, sustainability is also an ecological value. The school's commitment to the Eco-school programme raises an important question: how can ecological values coexist with digital development? As part of this programme, staff created a climate mural, a tool that helps participants understand the functioning, scale and complexity of climate change issues together with the impact of digitisation. The annual 'Lower the Voltage, Raise the Attention!' week, observed across all CSVR schools, focuses on energy consumption. On Fridays, the school implements a 'screen-free' day, where lessons are conducted without computers, projectors or printers. Students also produce eco-friendly tips that are broadcast over the school's loudspeakers. Interestingly, many of these clips relate to digital practices.

The case study complements the European Schoolnet's publication 'School strategies for fostering students' digital competencies. Guidelines for school leaders'.
Find the publication and other case studies at **fcl.eun.org/icwg**

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