Stakeholder Approach to the Pedagogical Possibilities and Practices of the Mindsport Bridge

SGSSS PhD Studentship: Additional Project Information

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Project Overview and Rationale

This proposal is borne out of an emerging area, 'Mindsport Studies', which has been dominated by research on chess. Bridge has seen a recent increase in research but has focused on adults rather than children. Studies conducted by *Bridge: A MindSport for All* (BAMSA) include strategic interactions of elite players (Punch and Snellgrove 2021), community and identities (Punch et al. 2021), motivations (Punch et al. 2022), emotions (Punch and Russell 2022) and gender (Rogers et al. 2022). To address the paucity of bridge research with children, this collaborative study with the World Bridge Federation (WBF) will focus on childrens' and teachers' perspectives of bridge as a meaningful school-based activity in the context of interdisciplinarity, collaboration and problem-based learning.

Bridge is a unique mindsport as it is always played in partnership, making it particularly suitable for exploring core aspects of Scottish education: the capacity-based approach, the concept of meta-skills, health and wellbeing agenda, and the emphasis on collaboration (Education Scotland 2023). By looking at planned and more reflexive pedagogies to facilitate children's bridge-learning practices, this study will investigate the ways we can better support the concept of cognitive challenges (problem identifying and solution finding) for diverse groups of children.

There is a long history of games being used in schools to support learning and increase positive engagement (Beavis 2014; Cheng et al. 2009; Kebritchi et al. 2010; Ramani and Eason 2015). Game-based learning is a way of scaffolding meaningful learning (Bado, 2018); promoting pupil motivation and engagement (Faiella and Riccardi 2014; Van Eck 2006) and encouraging peer-to-peer learning (Squire and Jenkins 2003). Various studies have examined the potential benefits of integrating chess into formal education curriculums, mostly to improve mathematical abilities (Campitelli and Gobet 2008; Gliga and Flesner 2014; Gumede and Rosholm 2015; Islam et al. 2021; Poston and Vandenkieboom 2019; Sala et al. 2015; Scholz et al. 2008). Children's participation in chess training has been found to have a positive impact on "meta-cognitive processes" and their academic performance (Meloni and Fanari 2019).

Looking beyond mathematics to wider learning benefits, there has been research on the transferable skills developed through the mindsport chess, including cooperation and social skills (Puddephatt 2003), planning abilities (Unterrainer *et al.* 2006), calculation and evaluation (Fine 2014). Chess has been found to improve children's cognitive abilities, problem-solving capacity, and social-emotional development (Aciego et al. 2012); concentration, self-regulation and behaviour (El-Daou and El-Shamieh 2015); adaptability and flexibility (Grau-Perez and Moreira 2017); ability to think strategically in

relation to risk (Islam et al. 2021); and the development of positive social skills (Forrest et al. 2005; Vitaro et al. 2022). In contrast, there is almost no published research on the potential of the mindsport bridge to contribute to education, and the proposed project will address this gap.

The multidimensional concept of physical literacy (Whitehead 2010) offers a useful underpinning upon which to explore the IOC-recognised card game of bridge (WBF 1995). Children, in developing their literacy proficiencies, are better prepared and positioned to select and deploy numeracy skills and competencies in ways that enhance their health and wellbeing. This study will investigate potential opportunities to develop critical thinking through metacognitive awareness (Brown, 1987; Murray and Napper-Owen 2021). By using an interdisciplinary learning (IDL) approach, there will be a consideration of how the mindsport bridge is, and could be, experienced in curricular and extra-curricular programmes in relation to health and wellbeing, numeracy and literacy. Incorporating school activity with bridge in the community will include intergenerational learning and shared family experiences around mindsport.

Aims	Suggested Research Questions
1. To understand the current landscape of **game forms of learning** in primary schools in Scotland.	• In what ways is game-based learning used in school, out of school and in the community across Scotland? • What pedagogies are schools currently using to support learning and teaching of bridge and other games?
2. To explore the **motivations** and **experiences** of learning and playing bridge in curricular and extra-curricular activities, and within the community	• How is the mindsport bridge understood, embodied and practiced from the perspectives of pupils and teachers? • To what extent, if any, does children's motivation and problem-solving capacity increase through playing the game of bridge?
3. To inform school management and education policymakers about the **pedagogical possibilities and practices** of the mindsport bridge	• In what ways can bridge address the priorities and challenges expressed in educational policy? • How can bridge be improved and sustained as part of a meaningful and inclusive educational practice within school and in the community?

The study will consist of three phases reflecting the above three aims:

Phase 1: an audit of games and bridge played in school, out of school and in the community across Scotland.

Phase 2: an exploration of bridge experiences across learning domains (cognitive, affective and psychomotor). This includes building understanding and knowledge, reading the game (and game players) and building awareness around the game, building resilience through coping with setbacks and re-setting concentration, communication skills, social interactions, and fine motor control in handling cards through bridge.

Phase 3: analysis of research findings will enable recommendations to be developed for schools and policy makers. A toolkit of the bridge pedagogies and guidance for pupils, teachers, senior and mid-management will be co-produced with the World Bridge Federation.

Methods

The study will incorporate a mixed methods approach involving six school case studies with the research design and outputs to be shaped by the student and the WBF. A quantitative survey will audit the existing use of games (e.g. board games) and mindsport (e.g. bridge, chess) in Scotland. Qualitative interviewing, incorporating visual tools, with teachers and pupils will explore the lived experiences of bridge, including perceptions of children's social-emotional interactions with their partner and opponents, transferable skills, impact on health and wellbeing and collaborative learning. A qualitative inquiry approach encompasses that set out, whilst also staying reflexive to what could emerge through this evolving co-partnering approach. This enables the researcher to stay mindful of the constraints of the current framework and open to the possibilities beyond this (e.g. responding to formative ways game forms are used to connect critical thinking concepts by the players themselves, and how this is captured across the project).

Declarative, procedural and contextual knowledge will be measured using participant self-regulatory capacities (Metallidou and Vlachou 2010). Metacognitive Awareness Inventory (MAI, Sperling et al. 2002) will be used to capture the process of critical thinking and Intrinsic Motivation Inventory (IMI, Ryan and Deci 2000; 2017) will measure children's enjoyment of bridge. MAI assesses children's capacity to critically think through an activity, allowing an understanding of how children problem-solve through the game of bridge. Triangulation of the mixed methods will demonstrate the outcomes and experiences of playing bridge in and out of school.

Phase 1: Liaising with Education Scotland, an email survey to primary schools will map the landscape and enable purposive sampling of six schools: two using bridge within the curriculum, two with an after-school club and two with bridge in the community (intergenerational bridge in evenings/weekends). Three schools offering their own suite of board games, across and beyond their curriculum, will be invited to participate as controls. From an equitable standpoint, all cohorts will receive the resource and guidance for sustainable use post-study.

Phase 2 (see Table 1)**:** Each school will teach the same bridge content (provided by the WBF and BAMSA including a teacher handbook, with implementation supported by the Scottish Bridge Union (SBU)). To enable a comparison of pedagogical approaches, three

schools will use a direct instructional approach and the other three an inquiry approach. School teachers will attend an online training workshop with the WBF and SBU to guide them in using the bridge teaching kit.

Table 1: Fieldwork during Phase 2

<table>
<tr><th>Sample schools</th><th>Pedagogical approach</th><th>Interviews</th><th>Surveys</th></tr>
<tr><td rowspan="3">1&2 bridge within the curriculum</td><td>1: direct instruction (DI)</td><td rowspan="9">Each school:

Interviews with teachers including senior/mid-management (approx. 12)

Focus groups with children (approx. 12 groups, 4-5 children per group)</td><td rowspan="9">Each school at the start and end of engagement:

Metacognitive Awareness Inventory (MAI)

+ Intrinsic Motivation Inventory (IMI)</td></tr>
<tr><td>2: indirect instruction (problem-based learning through metacognition)</td></tr>
<tr><td>3: school led (control)</td></tr>
<tr><td rowspan="3">4&5 an after-school bridge club</td><td>4: direct instruction</td></tr>
<tr><td>5: indirect instruction</td></tr>
<tr><td>6: school led (control)</td></tr>
<tr><td rowspan="3">7&8 bridge in the community</td><td>7: direct instruction</td></tr>
<tr><td>8: indirect instruction</td></tr>
<tr><td>9: school led (control)</td></tr>
</table>

Ethical issues in researching with children will be guided by BERA (2018) and Alderson and Morrow (2011), through ethical reasoning of and through research design (Poth, 2023) including ongoing informed consent, and participatory and visual tools within interviews to lesson power imbalances (Punch 2002a, 2002b, 2007).

Anticipated Outcomes and Impact

A key outcome will be a successful PhD completion: a skilled researcher with a PhD thesis and expertise in Mindsport Studies. The research will generate layered and multifaceted sociological and educational knowledge of pupils' experiences of learning and playing bridge as situated within and outside schools. By exploring the educational significance and societal value of youth bridge, the study will co-produce tangible outputs with the WBF (toolkit of the bridge pedagogies and best practice guides for pupils, teachers, senior and mid-management) and actionable insight (recommendations targeted at policymakers, educators, and members of the bridge community) at a local and global level.

Through mindsport practices, the project will contribute to the aim of the Scottish Curriculum for Excellence (CfE) for supporting children to become 'successful learners, confident individuals, responsible citizens, and effective contributors' (Education Scotland 2024). Using the interdisciplinary learning (IDL) and metacognition approach will be of interest to the World Bridge Federation and Education Scotland, showing the various ways that the mindsport bridge can be experienced across pedagogical contexts.

Given that education policy is now simultaneously local and global, with dominant policy ideas being translated into local contexts, many countries are adopting a skills or competency-based curriculum model (Ozga and Lingard 2007). Thus, it is anticipated that learning from these case studies within Scotland can be transferred to countries with a similar focus on generic skills or competences. By working with the World Bridge Federation, the Scottish Bridge Union, Education Scotland and Stirling Centre for Research into Curriculum Making (SCRCM), more schools can be supported to introduce bridge as an educational tool, potentially leading to benefits in health and wellbeing, collaborative learning and the development of transferable skills.

Dissemination and Knowledge Exchange

The research findings will be disseminated via:

1. academic journals and conferences, where publication will be supported via collaboration with colleagues in SCRCM and BAMSA

2. presentations throughout the PhD for bridge teachers and organisations who will help shape project progress, e.g. SBU, WBF, European Bridge League (EBL), American Bridge Teachers Association (ABTA)

3. educator workshops and seminars to share good practice and toolkit, including Education Scotland and SCRCM

4. toolkit and guidance, co-created with the WBF, shared with 101 countries (WBF members) and circulated widely via BAMSA's international network. These resources will be freely available via the websites of the WBF, SBU, EBL, ABTA and BAMSA.

Timetable

Year1: Practitioner engagement, literature review, ethical approval, negotiating access, developing interview guides and survey. End of year: conduct Phase 1 audit.

Year2: Phase 2 quantitative and qualitative fieldwork in 6 schools. Preliminary analysis and writing, practitioner presentations.

Year3: Phase 3 toolkit and guidance development. Ongoing analysis, writing, dissemination and impact activities.
Additional 6 months (across the PhD): skills training and research in practice.

Supervision and Training:

The principal supervisor will be Samantha Punch, Professor of Sociology, with expertise in the sociology of mindsport and sociology of childhood. As the founder of the research project, *Bridge: A MindSport for All* (BAMSA – https://bridgemindsport.org/), and an international bridge player, she will support the student in relation to Mindsport Studies as an emerging academic field. She has collaborated with bridge organisations for various studies: *Bridging Minds* (WBF), *Bridging Covid* (SBU), and *Bridging Wellbeing* (EBED).

BAMSA hosted two online conferences (2021 https://bridgemindsport.org/bridging-academia-policy-practice-conference/; 2023 https://realbridge.online/teacher-coach-conference-2023-directory/), and these recorded sessions will provide contextual information for the student regarding scholastic bridge in other countries. The international BAMSA network will enable the student to be well connected with practitioners and policymakers in the bridge world.

The second supervisor, Dr Alison Murray (http://orcid.org/0000-0001-9998-7666) leads Initial Teacher Education (ITE)'s Lifelong Health and Wellbeing; co-constructing meaningful practice with student teachers through and beyond Physical Education, across the breadth of school curricula. She will support the student regarding embodied educational practices which facilitate the development of agency for children toward healthy living. Murray's experience of creating a variety of pedagogies across a range of differing participatory contexts will be particularly relevant for this studentship (Murray and Adams 2019). Her work spans curricular time, lunch and after school contexts to support pupils with varying needs and aspirations (Murray et al. 2018; Murray and Howells 2023). She will support the student in relation to evaluating motivation, engagement and critical thinking across curricular and outside curricular offerings.

The WBF will facilitate opportunities for the student to present ongoing work at relevant bridge conferences. In addition to monthly supervision meetings and regular postgraduate seminars, the student will also join Faculty research groups in Curriculum (SCRCM), Social Surveys and Statistics, and Child Well-being. The student will attend workshops delivered by the Stirling Centre for Research into Curriculum Making (SCRCM) in order to enhance their educational policy and curriculum-making knowledge.

At the University of Stirling, the student will benefit from advanced training events and workshops at the interdisciplinary Centre for Research and Innovation in Sport and the Institute for Advanced Studies (IAS) including the Researcher Development Programme and the annual Festival of Research. With the Faculty, there are weekly PGR seminars, the monthly 'How to be an Academic' series, informal PGR Peer Groups, and an extended Induction series with sessions on methods, ethics, project management, communicating research and impact. Externally, they will attend SGSSS-led events

including the Summer School, and institutional training as identified in the DNA; as well as events run by the PGR network of the Leisure Studies Association.

Development Needs Analysis

The student will engage with subject-specific, core research and advanced training that meet ESRC requirements and will be relevant to this study: research philosophies, ethics, mixed methods data collection and analysis (including software NVivo/SPSS), data management; dissemination and impact. Transferable skills training will be required: communication (and to different audiences), networking, leadership and management, career development. Specific to this topic are skills and knowledge relating to researching with children, conducting and analysing MAI and IMI surveys, collaborating with practitioners, developing recommendations from research and pathways to impact (leading to impact in practice).

The specifics will be determined following a rigorous Development Needs Analysis when the student joins the University and reviewed at six-monthly intervals. Development opportunities will be internal and external: at Stirling by BAMSA, research groups, Faculty (PGR seminars, annual conference) and University (IAS, inductions, researcher development programme, Festival of Research). Outside Stirling events include SGSSS (induction, Spring into Methods, summer school, career training), NCRM and national and international conferences. With the collaborative partner, the student will attend WBF events on youth bridge (e.g. recruitment and retention), teaching and promoting bridge.

Research in Practice - Placements

All SGSSS funded students will be expected to undertake a three-month placement within an academic institution (either working within a research centre or with a professional services team), or with a public, private or third sector organisation. A possible placement partner for this project would be the Scottish Government. This would enable the student to develop transferrable skills mapped to the Vitae Research Development Framework: creating impact outside academia, building their professional network, and engaging in meaningful knowledge exchange. The skills and relationships developed through such an internship benefit the student's doctoral work as they could position their work within the wider, non-academic landscape and current policy priorities. The experience would also enable them to learn how to shape policy agendas and enhance their ability to articulate research findings in succinct and engaging ways to a wide range of audiences.

References

Aciego, R., García, L. and Betancort, M. (2012) 'The benefits of chess for the intellectual and social-emotional enrichment in schoolchildren,' *The Spanish Journal of Psychology*, 15(2): 551-559.

Alderson, P. and Morrow, V. (2011) *The Ethics of Research with Children and Young People: A Practical Handbook,* London: Sage.

Bado, N. (2019) 'Game-based learning pedagogy: A review of the literature'. *Interactive Learning Environments*, 30(5): 936–948. https://doi.org/10.1080/10494820.2019.1683587

Beavis, C. (2014) 'Games as text, games as action: Video games in the English classroom', *Journal of Adolescent & Adult Literacy*, 57(6), pp. 433–439. Available at:https://www.jstor.org/stable/24034340.

BERA (2018) '*Ethical Guidelines for Educational Research'*. https://www.bera.ac.uk/publication/ethical-guidelines-for-educational-research-2018

Brkljacic, T., Sucic, I. and Brdovcak, B. (2017) 'Serious leisure activities and well-being of senior citizens: The case of contract bridge.' *Andragogiczny*, 24: 157-174.

Bronfenbrenner, U. (1979) *The Ecology of Human Development: Experiments by nature and design*. Harvard University Press.

Brown, A. (1987) *Metacognition, Executive Control, Self-regulation, and Other More Mysterious Mechanisms*. New Jersey: Lawrence Erlbaum Associates.

Bull, C., Hoose, J. and Weed, M. (2003) *An Introduction to Leisure Studies*. London: Prentice Hall.

Campitelli, G. and Gobet, F. (2008) 'The role of practice in chess: A longitudinal study,' *Learning and Individual Differences*, 18(4): 446-458.

Cheng, H. N., Wu, W. M., Liao, C. C. and Chan, T. (2009) 'Equal opportunity tactic: Redesigning and applying competition games in classrooms', *Computers & Education*, 53(3): 866-876.

Dolbysheva, N. (2020) 'Fundamentals of long-term training systems in mind sports', *Human Movement*, 21(3): 1–20.

Dweck, C.S. (2006) *Mindset: The new psychology of success*. New York: Random House.

Fine, G.A. (2014) 'Strategy and sociability: The mind, the body, and the soul of chess', *American Journal of Play*, 6(3): 321-344.

Education Scotland (2023). Health and wellbeing. https://education.gov.scot/parentzone/curriculum-in-scotland/curriculum-areas/health-and-wellbeing/

Education Scotland (2024) What is Curriculum for Excellence? Available at: https://education.gov.scot/curriculum-for-excellence/about-curriculum-for-excellence/what-is-curriculum-for-excellence/

El-Daou, B. and El-Shamieh, S. (2015) 'The effect of playing chess on the concentration of ADHD students in the 2nd cycle', *Procedia - Social and Behavioral Sciences*, 192: 638–643.

Englemann, S.E.(1968) '*Relating operant techniques to programming and teaching*'. Journal of School Psychology, 6, 89-96.

Forrest, D., Davidson, I., Shucksmith, J. and Glendinning, T. (2005) Chess Development in Aberdeen's Primary Schools: A study of literacy and social capital. Research report. Available: https://abdn.elsevierpure.com/en/publications/chess-development-in-aberdeens-primary-schools-a-study-of-literac

Gibson, J J. (1979) *The Ecological Approach to Visual Perception*. Boston: Houghton Mifflin.

Gliga, F. and Flesner, P.I. (2014) Cognitive benefits of chess training in novice children. *Procedia-Social and Behavioral Sciences*, 116: 962-967.

Grau-Pérez, G. and Moreira, K. (2017) 'A study of the influence of chess on the Executive Functions in school-aged children/Estudio del impacto del ajedrez sobre las Funciones Ejecutivas en niños de edad escolar', *Estudios de Psicología*, 38(2): 473-494.

Gumede, K. and Rosholm, M. (2015) Your move: The effect of chess on mathematics test scores. Forschungsinstitut zur Zukunft der Arbeit, IZA Discussion Paper No. 9370, September 2015.

Hsiang, T. (2016) 'IMSA Prospectus', *International Mind Sports Association*. Available from: http://www.imsaworld.com/wp/prospectus/ [Accessed 2 May 2019].

Islam, A., Lee, W.S. and Nicholas, A. (2021). The effects of chess instruction on academic and non-cognitive outcomes: Field experimental evidence from a developing country. *Journal of Development Economics, 150*, p.102615.

Kebritchi, M., Hirumi, A. and Bai, H. (2010) 'The effects of modern mathematics computer games on mathematics achievement and class motivation,' *Computers & Education*, 55(2): 427-443.

McDonnell, D., Punch, S. and Small, C. (2017) *Individual Wellbeing and Bridge: An Empirical Analysis*, Aylesbury: English Bridge Education & Development (EBED) https://www.ebedcio.org.uk/files/docs/research/individual-wellbeing-and-bridge-an-empirical-analysis.pdf

Meloni, C. and Fanari, R. (2019). *Chess Training Effect on Meta-Cognitive Processes and Academic Performance*. 16th International Conference on Cognition and Exploratory Learning in Digital Age (CELDA 2019). International Association for Development of the Information Society.

Metallidou, P. and Vlachou, A. (2010) 'Children's self-regulated learning profile in language and mathematics: The role of task value beliefs', *Psychology in the Schools*, 47(8): 776-788. doi: 10.1002/pits.20503

Murray, A.M. (2015) 'Empowerment of the student through team-based learning and assessment in sports coaching'. Professional Learning Matters. Physical Education Matters, *Official Journal of the Association for Physical Education*, Autumn, 10, 3; 64-67.

Murray, A. and Adams, S. (2019) '*The Physicality to Mental Health and Mentality of Physical Education: A Complex Spiral'*. In Peters, M. A. (ed.) Encyclopedia of Teacher Education. Singapore: Springer.

Murray, A., Adams, S., Kaitell, E., Shaughnessy, J. and Murray, P. (2018) 'Using learning domains to complement primary physical education teacher education in primary school settings'. Learning Matters, Physical Education Matters, *Official Journal of the Association for Physical Education*, 13, 2; 54-57.

Murray, A. and Howells, K. (2023) 'Wheels Up, spiral progression pedagogy towards creative movers using wheels'. *Journal of Early Childhood Education Research*, 12(1): 54-78. https://journal.fi/jecer/article/view/116985

Murray A. and Napper-Owen G. (2021) 'Metacognition, the METAPE-3, a new instructional model for physical education'. In Peters M.A. (Eds) *Encyclopedia of Teacher Education*. Springer, Singapore. https://doi.org/10.1007/978-981-13-1179-6_421-1

Ozga, J. and Lingard, B. (2007). Globalisation, education policy and politics. In: B. Lingard and J. Ozga, eds. *The Routledge Falmer Reader in Education Policy and Politics*. London: Routledge, pp. 65-82.

Poston, D.I. and Vandenkieboom, K.K. (2019). The effect of chess on standardized test score gains. *Sage Open, 9*(3). https://doi.org/10.1177/2158244019870787

Poth, C.N. (2023) *The Sage Handbook of Mixed Methods Research Design*. London: Sage Publications Ltd. https://doi.org/10.4135/9781529682663

Puddephatt, A.J. (2003) 'Chess playing as strategic activity', *Symbolic Interaction*, 26(2): 263-284.

Punch, S. and Russell, Z. (2022) 'Playing with emotions: Emotional complexity in the social world of elite tournament bridge', *Emotions and Society,* 4(2): 238-256. https://doi.org/10.1332/263169021X16420048324097

Punch, S., Russell, Z., & Graham, E. (2022). Serious leisure experience in a dyadic pursuit: Elite player motivations and participation in tournament bridge. *Leisure Studies, 41*(1), 12-27.

https://www.tandfonline.com/doi/full/10.1080/02614367.2021.1942524

Punch, S. and Snellgrove, M. (2021) 'Playing your life: Developing strategies and managing impressions in the game of bridge', *Sociological Research Online*. 26(3): 601–619. DOI: https://doi.org/10.1177/1360780420973043

Punch, S., Russell, Z. and Cairns, B. (2021) '(Per)forming identity in the mind-sport bridge: Self, partnership and community', *International Review for the Sociology of Sport*. 56(6): 804-822. https://doi.org/10.1177/1012690220959648

Punch, S. (2007) "I felt they were ganging up on me": Interviewing siblings at home, *Children's Geographies,* 5(3): 219-234.

Punch, S. (2002a) 'Interviewing strategies with young people: The 'secret box', stimulus material and task-based activities', *Children & Society*, 16(1): 45-56.

Punch, S. (2002b) 'Research with children: The same or different from research with adults?' *Childhood*, 9(3): 321-341

Ramani, G.B. and Eason, S.H. (2015) 'It all adds up: Learning early math through play and games', *The Phi Delta Kappan*, 96(8): 27–32. Available at: https://www.jstor.org/stable/24375883.

Rogers, A., Snellgrove, M.L. and Punch, S. (2022) 'Between equality and discrimination: The paradox of the women's game in the mind-sport bridge,' *World Leisure Journal,* 64(4): 342-360. http://dx.doi.org/10.1080/16078055.2022.2051068

Ryan R.M. and Deci E.L. (2000) 'Self determination theory and the facilitation of intrinsic motivation, social development, and well-being'. *American Psychologist*, 55(1):68-78. DOI: 10.1037/0003-066X.55.1.68

Ryan R.M. and Deci E. L. (2017) *Self-determination Theory: Basic Psychological Needs in Motivation Development and Wellness*. New York, NY: Guilford Press.

Sala, G., Gorini, A. and Pravettoni, G. (2015) 'Mathematical problem-solving abilities and chess: An experimental study on young pupils', *Sage Open*, 5(3): 1-9.

Scholz, M., Niesch, H., Steffen, O., Ernst, B., Loeffler, M., Witruk, E. and Schwarz, H. (2008) 'Impact of chess training on mathematics performance and concentration ability of children with learning disabilities'. *International Journal of Special Education*, 23(3): 138-148.

Scottish Government (2022). Getting it right for every child (GIRFEC)-Statutry Guidance-Part 18 (section 96) of the Children and Young People (Scotland) Act 2014. https://www.gov.scot/publications/getting-right-child-girfec-statutory-guidance-assessment-wellbeing-2022-part-18-section-96-children-young-people-scotland-act-2014/

Sperling, R.A., Howard, B.H., Miller, L.A. and Murphy, C. (2002) 'Measures of children's knowledge and regulation of cognition,' *Contemporary Educational Psychology,* 27(1): 51-79.

Squire, K. and Jenkins, H. (2003) 'Harnessing the power of games in education', *Insight*, 3(1): 5-33.

Stebbins, R.A. (1992) *Amateurs, Professionals and Serious Leisure*. McGill-Queens University Press: Montreal.

Unterrainer, J.M., Kaller, C.P., Halsband, U. and Rahm, B. (2006) 'Planning abilities and chess: A comparison of chess and non-chess players on the Tower of London task', *British Journal of Psychology*, 97(3): 299-311.

Van Eck, R. (2006) 'Digital game-based learning: It's not just the digital natives who are restless', *Educational Review,* 41(2): 16-28.

Vitaro, Tremblay, Park, Cote, Beasley, Algan (2022) 'Early lessons in social skills and self-control bring lifelong benefits,' Research Report. Centre for Economic Policy Research, 2022. Available: https://cepr.org/voxeu/columns/early-lessons-social-skills-and-self-control-bring-lifelong-benefits

Vygotsky, L.S. (1987) *The Collected Works of L.S. Vygotsky, Vol. 1. Problems of General Psychology*. (R. W. Rieber & A. S. Carton, Eds.) Plenum Press.

Whitehead, M. (2010) *Physical Literacy: Throughout The Lifecourse*. London: Routledge.

World Bridge Federation (2024) *IOC Recognition-World Bridge*. http://www.worldbridge.org/