



Doctoral Dissertation Information

Dissertation title: Estudio del engagement en el contexto educativo y su influencia en el desarrollo del niño de educación infantil (4 a 6 años)

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Doctoral Dissertation Summary

Introduction

Findings on child brain developmental research (Center of the Developing Child Harvard University, 2017; Shonkoff & Phillips 2000) and bio-ecological and transactional developmental theories (Bronfenbrenner & Morris, 2006; Sameroff & Fiese, 1990, 2000) point to children's interactions with the environment as the engines of development and learning. Children's participation is regarded as a means and an end that enables learning and development (Imms et al., 2017). Therefore, to promote children's development and learning is necessary to encourage their participation in daily routines, as these offer the opportunities for children to practice and acquire skills (McWilliam, 2016).

Coelho and Pinto (2018) identified two dimensions of participation 1) the time children spent in an activity in their natural setting and 2) the level of engagement while attending to the activity. This operationalization is also understood as engagement. A child who is engaged in an activity is participating in it. McWilliam and Bailey (1992) defined engagement as the amount time children interact with adults, peers and materials in a developmentally and contextually appropriate manner. This definition regards the amount of time and the complexity of the child's behaviors while participating.

Engagement has been related to children's positive developmental trajectories (Aguiar & McWilliam, 2013; Grande, 2010; Pinto, Barros, Aguiar, Pessanha, & Bairrão, 2006) and it is considered a predictor of later engagement and academic success (Alexander, Entwisle, & Horsey, 1997; Ladd & Dinella, 2009; Skinner, Furrer, Marchand, & Kindermann, 2008) and a quality indicator



of educational environments (Aguiar & McWilliam, 2013; Casey & McWilliam, 2007; Ridley, McWilliam, & Oates, 2000). In secondary education, promoting students' engagement in classroom activities has been found to be an antidote to school dropout (Wang & Eccles, 2012), poor motivation, and low academic performance (Arguedas-Negrini, 2010).

Empirical efforts to identify variables related to children's engagement have revealed links to children's individual characteristics such as developmental level, chronological age (Aguiar & McWilliam, 2013; de Kruif & McWilliam, 1999), disability status (Coelho & Pinto, 2018), the sex of the child (Ulich & Mayr, 2002) and emotional strengths and difficulties (Booren, Downer, & Vitiello, 2012; Doctoroff, Greer, & Arnold, 2006; Eggum-Wilkens et al., 2014; Test & Cornelius-White, 2013). In addition, researchers have also found a relation between engagement and family characteristics like mother's educational level (DeLay, Hanish, Martin, & Fabes, 2016) and contextual characteristics like the schedule of activities, staff assignment, global quality of the early childhood program (Lelaurin & Risley, 1972; Dunst, McWilliam & Holbert, 1986; McWilliam, Trivette, & Dunst, 1985) and activity types (Booren et al., 2012; Fuligni, Howes, Huang, Hong, & Lara-Cinisomo, 2012; Kontos et al., 2002; Veiga, Galvão, Festas, & Taveira, 2012; Vitello & Williford, 2016).

Researchers' and practitioners' better understanding of the relevance of children's engagement for promoting developmental outcomes and the variables related to children's engagement in classroom routines has impacted preschool classroom practices. Professional development and quality standards include developmentally appropriate practices that fit children's individual characteristics in order to enhance engagement of children and, therefore, contribute to their development.

The proposed practices relate to the organization of the physical and temporal environments, the interaction processes between teachers and children, the collaboration with families and the communities (based on meaningful relationships) and the individualization of teaching for all children. The NAEYC's (Copple & Bredekamp, 2009) *Developmentally Appropriate Practices* manual offers guidance on specific practices that could be followed to enhance children's engagement and development. In addition, response-to-intervention curricular frameworks are also recommended to enable the individualization of supports for children with diverse functioning in the early childhood classrooms routines (Grisham-Brown, Hemmeter, & Pretti-Frontczak, 2017). These recommendations pretend to build on children's competencies so that developmental trajectories evolved.



In Spain, the Ministry of Education supports the development of children's competencies as it is reflected on the education law (LOMCE, 2013). Contents, objectives and evaluation criteria are dictated by the correspondent agency of each autonomous community. In Valencia, these contents are mandated by the DOCV 2008/3838. Even though contents, objectives and evaluation criteria are provided no methodological practices or practices are defined.

Research on Spanish children's engagement levels and the quality early childhood programs reveals poor-to-minimal quality of preschool services (Barandiaran, Muela, López de Arana, Larrea & Vitoria, 2015; Cisneros Delgado & Vílchez Luzón, 2016; Larrea, López de Arana, Barandiaran & Vitoria, 2010; Lera 1994; Sandstrom, 2012; Vemeer et al, 2010) and median scores of engagement levels of children (Barandiaran et a., 2015; Larrea et al., 2010; Miranda, Larrea, Muela, & Barabdiaran, 2016). We identified a need for continuing the study of the quality of early childhood education programs and the variables related to children's engagement in routines in Spanish preschool classrooms.

The current project presents a literature review on engagement, the developmental profiles of children aged 4 to 6, and recommended and developmentally appropriate early childhood education practices. Moreover, we introduce a research project developed for describing Valencian children's engagement levels in preschool classroom routines, the quality of early childhood education classrooms and the relationships between children's engagement scores and individual variables (developmental level, age, emotional strengths and difficulties) and contextual variables (global classroom quality and teacher-child interactions).

Empirical Work

Participants

The study had 107 children enrolled in early childhood education programs, 52 girls and 55 boys, as well as 23 teachers (4 male and 19 female) from 23 classrooms in 6 schools in the Province (i.e., County) of Valencia, Spain. From these 6 schools, three were charter schools, two public centers and one private preschool.

Centers were recruited between April, May, and June 2016 and only preschool classrooms for 4- and 5-year-olds were included in the study. Five children were randomly selected from each classroom. The researchers generated five random numbers for each classroom, using an online non-



repeated random number generator (i.e., Azar). The five random numbers were given to the teachers, to select the corresponding children according to the order of the class roster. If a child did not meet the inclusion criteria or the parents did not sign his or her informed consent form, the teachers were instructed to go to the next child in the order of the class roster.

The inclusion criteria for the children were age in months (i.e., 36-72 months) and attending the classroom since the beginning of the academic year. For the teachers, the inclusion criterion was being the main teacher in the classroom since the beginning of the school year.

Children's age ranged from 49 to 72 months ($M = 60.99$, $SD = 6.94$, 4-year-olds = 50, 5-year-olds = 52). In terms of ability status, parents reported 96.1% of the children did not have disabilities, and 3.1% had a diagnosed disability (autism spectrum disorder, global developmental delay, and language delay).

The teachers' age ranged between 25 and 53 years ($M = 36.95$, $SD = 6.47$) and the average length of teaching years was 12.10 years ($SD = 6.48$). In educational preparation, 95.4% of teachers had a degree in early childhood education or the equivalent.

Instruments

The parents or legal guardians and the teachers completed a socio-demographic data questionnaire developed for this research. The variables were operationalized using the following instruments:

Battelle Developmental Inventory Screening Test (BDI-ST, Newborg et al., 1988). This screening tool, in the Spanish version (Newborg, González-Criado, & De la Cruz López, 1996), was used to assess the developmental level of children.

Strengths and Difficulties Questionnaire (SDQ, Goodman, 1997). This questionnaire evaluated children's emotional strengths and difficulties. It was used the teacher-report, 4- to 17-year-olds, version.

Scale for Teachers' Assessment of Routines Engagement (STARE, McWilliam, 2000). This scale assesses child engagement in classroom routines. It is completed by the teachers, who report, for each routine (i.e. arrival, circle time, indoor play in centers, teacher-led activities, meal time, and outdoor play), the amount of time the child is engaged with adults, peers, and materials, and the sophistication level of engagement (thereafter: SLE). The sophistication level of engagement is operationalized in five levels, from no engagement to



sophisticated engagement (Levels: no engagement, unsophisticated engagement, average engagement, advanced engagement, sophisticated engagement).

Early Childhood Environments Rating Scale-3 (Harms, Clifford, & Cryer, 2014). This instrument evaluates the quality of the preschool classroom practices. It allows to calculate seven quality scores (1) Space and Furnishings, (2) Personal Care Routines, (3) Language and Literacy, (4) Learning Activities, (5) Interaction and (6) Program Structure, and (7) total score.

Teaching Style Rating Scale (McWilliam et al., 1998). We used this scale for measuring the quality of the teacher interactions with children. The TSRS consists of two dimensions: Teaching behaviors and Affect. Teaching behaviors consist of 7 items (Redirects, introduces, elaborates, follows, informs, acknowledges, and praises), whereas affect consists of 14 items related to the teachers' affective behaviors when interaction with children.

Procedure

After approval of the research project from the Institutional Review Board of the Universidad Católica de Valencia San Vicente Mártir, the directors of the centers were contacted to inform them about the project and invite them to participate. Once the directors confirmed their center's participation in the study, a meeting was held with the teachers of each center. At this meeting, teachers were provided with information related to the objectives of the project and instructions for completing the questionnaires. We provided the teachers with a workshop to teach them how to complete the STARE through a practice session, where we showed them videos with examples of the SLE and answered their questions. This session lasted approximately 45 minutes.

Data collection took place between November 2016 and May 2017. No data were collected during the first two months of the school year to give the teacher time to become familiar with the children before completing the scales. The participation of both teachers and children was voluntary and anonymous. Teachers and parents of participating children signed an informed consent form.

Once children were selected and parents signed the informed consent forms, the teachers began completing the STARE and SDQ questionnaires, and the researchers started evaluating the children using the BDI-ST. An individual meeting was held with each teacher to complete the items on the BDI-ST, based on observation and report.



Data Analysis. Prior to data analysis, the researchers performed a logit transformation of the raw scores on the STARE and SDQ scales (Bond & Fox, 2007). This was done to convert the ordinal data to interval data and comply with assumptions underlying the Pearson correlation, multiple regression, and variance analyses. For this purpose, the WINSTEPS program (Linacre, 2017) was used to generate the participants measure logits, that then were used to calculate a mean and standard deviation required to transform the scores using the formula: $\text{mean} \pm \text{logit} \cdot \text{SD}$ (Allen & Schumacker, 1998).

In addition, the skewness, kurtosis, linearity, dispersion of the scores, and the presence of multicollinearity and outliers were reviewed. Seven participants were excluded from the correlational and regression analyses because of missing scores on one or more of the subscales ($n = 6$) or being identified as an outlier ($n = 1$).

Descriptive analyses of raw engagement scores were calculated. The Friedman non-parametric test was used to determine if the differences on interactions with adults, peers, materials and SLE across routines were statistically significant. The Wilcoxon test was run for determining among which routines there were differences. The relationship between the variables was tested using the Pearson correlation coefficients, accepting only r values higher than .40 (Wallen & Fraenkel, 2001).

Regression analyses were conducted to evaluate mediation effects. The plug-in Process Macro for SPSS 22.0. (Hayes, 2012) was used to run simple mediation models (Model 4 in Process Macro) and test the mediating effect of emotional difficulties and hyperactivity between developmental level and SLE. The Bootstrapping method with 5000 bias samples and 95% confidence interval was used for testing the indirect effects of the mediation models (MacKinnon, Lockwood, & Williams, 2004; Preacher & Hayes, 2004). Chronological age was not included in the mediation models given the high correlations between this variable and developmental level (Pituch & Stevens, 2016, see Table 6). G*Power (Faul, Erdfelder, Buchner, & Lang, 2009) was used to ensure the sample size ($N = 95$) was appropriated for this analysis. It was determined that for a medium effect size of $f^2 = .15$, with $p < .05$, $1 - \beta = .90$, and 2 predictors, a sample size of 88 participants will be sufficient.

In addition, an univariate analysis of variance (Student's t test) and multivariate (Hotelling's T^2) were carried out to assess whether there were statistically significant differences between the age groups for SLE means, and between the SLE groups (i.e., sophisticated engagement levels vs. average engagement or lower levels) for developmental level and emotional strengths



and difficulties means. Statistical power for the t test was calculated post hoc using the software G*Power (Faul et al., 2009).

Results and Conclusions

Children's engagement was more frequent with peers and materials, and rare with adults. The overall sophistication level of engagement was average indicating that children participate in the routines by following the rules and answering close-ended questions, but they were less engaged on building, creating, solving problems, having extended conversations, or participating of symbolic or socio-dramatic play. Other Spanish studies have found similar results (Barandiaran et al, 2015; Larrea et al. 2010; Miranda et al., 2016).

The type of classroom routine was related with children's engagement type and level of sophistication. Engagement with peers was the highest among all routines; whereas engagement with adults was the lowest. Children had more advanced and sophisticated behaviors when they were engaged in free play and outdoor play. Researchers in the United States, have found similar results, concluding that the routines that support the initiatives, ideas, and interests of children and allow exploration and free play, are related to higher levels of engagement (Fulgini, Howes, Huang, Hong, & Lara-Cinisomo, 2012; Kontos et al., 2002; Booren et al., 2012; Veiga, Galvão, Festas, & Taveira, 2012; Vitello & Williford, 2016).

Free play is related to cognitive development because it requires, among other skills, deliberation, cognitive control, and problem solving (Moreno, Shwayder, & Friedman, 2017). These competences are related to the higher sophistication levels of engagement, what may explain why children present higher sophistication levels of engagement during free play routines compared to more structured activities. These results could have implications for the design of activities, as we are able to identify which activities may have a higher impact on cognitive development.

Children's developmental level and chronological age were related to their sophistication engagement levels, adding more evidence to support this well documented relationship (Aguar & McWilliam, 2013; Blasco, Bailey, & Burchinal, 1993; Coelho & Pinto, 2018, de Kruif & McWilliam, 1999; Grande, 2010). The interaction between the child's competences and interests and the demands of the routine results on the child's level of engagement or functioning in those routines. An adequate goodness of fit between these elements of functioning will ensure children's engagement and further development and learning (Boavida & McWilliam, 2015; McWilliam, 2016; Morales-Murillo, Grau-Sevilla; McWilliam & Soucase Lozano, under review).



The emotional difficulties of the child mediated the relationship between developmental level and sophistication level of engagement. These results supported the relevance of children's well-being and the impact that emotional difficulties could have on children's engagement levels regardless of their developmental level. Other authors have identified similar relationships between emotional difficulties and engagement levels (Bierman et al., 2009, Bierman et al., 2008; Bulotsky-Shearer, Bello, Romero & Carter, 2012; Gustafsson et al., 2016; Hemmeter et al., 2006; Raver & Knitzer, 2002).

Moreover, children's frequency of interaction with peers mediated between peer problems and sophistication level of engagement, and between prosocial behavior and sophistication level of engagement. Sjöman, Granlund, & Almqvist (2016) found that positive interaction with peers and teachers mediated the relationship between externalizing behaviors (behavioral problems and hyperactivity) and developmental and core engagement. Our results add to their findings because we identified that interaction with peers also mediates between internalizing problems and engagement levels. Peer relationships have been identified as protective factors against low engagement, effects that remain strong even after controlling for variables like the educational level of the parents and the gender and language proficiency of the child (Delay, Hanish, Martin, & Fabes, 2016).

The quality of the participant classrooms, both global quality and teacher-child interactions, was in the middle ranges. Other studies on early childhood preschool quality in Spain have found similar results (Barandiaran et al., 2015; Cisneros Delgado & Vílchez Luzón, 2016; Larrea et al., 2010; Lera, 1994; Sandstrom, 2012; Vermeer et al., 2010). Along with the above-mentioned authors, we identified a need for improving early childhood education services in Spain (Beresaluce Díez, 2009; Marina, Pellicer, & Manso, 2015).

Moreover, the global and teacher-child interaction quality was higher in those classrooms where children were allowed more minutes for free play. These results suggest that free play activities may offer more opportunities for emotional and instructional supports and better organizational management, as they facilitate individual interactions. McWilliam, Scarborough and Kim (2003) found that individualized interactions were related with higher quality than whole group interactions.

Finally, regarding engagement and classroom-quality, we identified a positive relationship between the quality of the interactions and children's engagement with teachers. Almqvist and Granlund (2005) related children's higher engagement with the quality of teacher-child interactions, regardless of



the disability status or behavioral difficulties of the child. Our results supported the positive impact of teacher-child responsive and caring interactions on children's engagement (Ben-Arieh & Frones, 2011; Claessens, 2012; Sjöman et al., 2016).

No relationship was identified between classroom quality and children's sophistication level of engagement. These results may be related to the low variability of quality scores in our sample, ranging from 2 to 4 in a 7-point scale (Barandiaran et al., 2015). Other researchers have identified thresholds of quality that predict developmental and learning outcomes of children (Burchinal et al., 2016a; Burchinal et al., 2016b; Burchinal, Zaslow & Torullo, 2016c; Xue et al., 2016; Zaslow et al., 2016). These authors found that early childhood quality affected children's outcomes only in those classrooms where quality scores were high (i.e., scores higher than 5 in the Early Childhood Environments Rating Scale, ECERS).

None of the classrooms in our study reached the threshold of quality what may explain why we did not find a relationship between classroom quality and children's sophistication level of engagement. Burchinal et al. (2016c) also recommended the use of scales that measure specific aspects of classroom quality, as global scales may not capture the relationship of these processes and children's outcomes. Our future studies must consider this recommendation.

These results add to the findings of other research projects, as we have identified a relationship between engagement and developmental level, age, emotional strengths and difficulties, and classroom quality (specifically teachers interactions and child engagement with adults). Nonetheless, these results reveal that there is still room to growth regarding the quality of early childhood environments in Spain. Twenty-four years of research in this topic translate in little to no change regarding practices. The discussion of this document will present the implications of this study and will suggest, based on other studies, the potential next steps towards improving the quality of early childhood programs and promoting inclusion of all children, their engagement, development, and learning.



Información sobre la Tesis Doctoral

Título de la tesis doctoral: Estudio del engagement en el contexto educativo y su influencia en el desarrollo del niño de educación infantil (4 a 6 años)

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Resumen de la Tesis Doctoral

La implicación del niño en las rutinas diarias se ha considerado como una de las dimensiones de la participación (Coelho y Pinto, 2018). Ésta se ha relacionado con un mayor nivel de desarrollo de los niños (Aguiar y McWilliam, 2013; Grande, 2010; Pinto, Barros, Aguiar, Pessanha y Bairrão, 2006) y se considera un predictor de la implicación en etapas educativas posteriores y la consecución de un mayor éxito académico (Alexander, Entwisle y Horsey, 1997; Ladd y Dinella, 2009; Skinner, Furrer, Marchand y Kindermann, 2008) así como un indicador de calidad de los entornos educativos (Aguiar y McWilliam, 2013; Casey y McWilliam, 2007; Ridley, McWilliam y Oates, 2000).

Los estudios sobre las variables relacionadas con la implicación de los niños han revelado asociaciones con las características individuales de los niños, como el nivel de desarrollo, la edad cronológica (Aguiar y McWilliam, 2013; de Kruif y McWilliam, 1999), el sexo (Ulich y Mayr, 2002), la presencia o no de discapacidad (Coelho y Pinto, 2018) y las capacidades y dificultades emocionales que el niño presenta (Booren, Downer y Vitiello, 2012; Doctoroff, Greer, y Arnold, 2006; Eggum-Wilkens et al., 2014; Sjöman, Granlund y Almqvist, 2016; Test y Cornelius-White, 2013). Por otra parte, los estudios también revelan una relación entre las características del contexto educativo y la implicación de los niños (Booren et al., 2012; Dunst, McWilliam y Holbert, 1986; Fuligni, Howes, Huang, Hong y Lara-Cinisomo, 2012; Kontos, Burchinal, Howes, Wisseh y Galinsky, 2002; Lelaurin y Risley, 1972, McWilliam, Trivette y Dunst, 1985; Veiga, Galvão, Festas, y Taveira, 2012; Vitello y Williford, 2016).

La investigación sobre los niveles de implicación de los niños y la calidad de los programas de educación infantil en España, revelan una calidad media de los programas educativos de las etapas infantiles (Barandiaran, Muela, López de Arana, Larrea y Vitoria, 2015; Cisneros Delgado y Vilchez Luzón, 2016; Larrea, López de



Arana, Barandiaran y Vitoria, 2010; Lera 1994; Sandstrom, 2012; Vemeer et al, 2010) y niveles medios de implicación de los niños en las actividades de educación infantil (Barandiaran et al., 2015; Larrea et al., 2010; Miranda, Larrea, Muela, y Barabdiaran, 2017). Así, identificamos la necesidad de continuar el estudio de la calidad de los programas de educación infantil y las variables relacionadas con la implicación de los niños en las rutinas del aula.

Este estudio se planteó evaluar la implicación de los niños en aulas de infantil de 4 y 5 años de la Comunidad Valenciana y relacionarla con variables individuales (nivel de desarrollo, edad, sexo, presencia de discapacidad y capacidades y dificultades emocionales) y variables contextuales (calidad global del aula y estilos de enseñanza del maestro). Asimismo se valoró los índices de calidad global de las aulas y del estilo de enseñanza docente.

Participaron en el estudio 107 niños (52 niñas y 55 niños) y 23 maestros, pertenecientes a 6 Colegios de Educación Infantil y Primaria (CEIP) de la Comunidad Valenciana, tres de los cuales eran concertados, uno privado y dos públicos. La edad media de los niños era 61 meses (DT = 6.94) y un 8% de los niños presentaba algún tipo de discapacidad. La selección de los niños fue aleatoria.

Se valoró la implicación de los niños con adultos, materiales y compañeros y el nivel de complejidad con la escala Scale for Teachers Assessment of Routines Engagement (McWilliam, 2000), el nivel de desarrollo con el Inventario de Desarrollo Battelle (Newborg, González-Criado y de la Cruz López, 1998), y las capacidades y dificultades emocionales con el Cuestionario de Capacidades y Dificultades (SDQ, Goodman, 1997). En cuanto a la calidad global de las aulas, se utilizó la escala ECERS-3 (Harms, Clifford y Cryer, 2014) y para los estilos de enseñanza la Teaching Styles Rating Scale (McWilliam, Scarborough, Bagby, y Sweeny, 1998). Se llevaron a cabo análisis paramétricos y no paramétricos de correlación, regresión, varianza y varianza múltiple.

Encontramos que los niños se implicaban menos con adultos y más con compañeros, y que la complejidad de la implicación era media (3.68 en una escala de 5 puntos). Además, observamos que los niveles de complejidad e implicación con adultos materiales y compañeros difería según el tipo de rutina en la que participaban los niños. Los niveles de implicación más complejos se observaron en actividades como el juego libre por rincones y el patio y los menores niveles durante la llegada y la asamblea.

Al considerar la calidad global de las aulas, los resultados revelan que ésta era mínima (3.07 en una escala del 1 al 7). Las menores puntuaciones de calidad se encontraron en la subescala de actividades para el aprendizaje y las mayores



puntuaciones en la subescala de interacción. En relación con el estilo de enseñanza docente, se encontró que los maestros tienden a puntuar más alto en comportamientos afectivos (apoyo emocional) que en los comportamientos dirigidos a la enseñanza (apoyo instruccional).

Encontramos que predominaban las actividades dirigidas y estructuradas y que solo se dedicaba un 20% del tiempo al juego libre (15% al patio y 5% al juego libre dentro del aula). Asimismo el tiempo dedicado al juego libre dentro del aula correlacionó de manera positiva y estadísticamente significativa con la calidad global del aula y el estilo de enseñanza docente.

Los resultados sobre la relación entre las variables individuales y contextuales con la implicación muestran que la edad en meses, el nivel de desarrollo y las capacidades emocionales se relacionaron de manera positiva y estadísticamente significativa con la complejidad de la implicación. Por otra parte, la presencia de discapacidad y las dificultades emocionales se asociaron de manera negativa y estadísticamente significativa con la complejidad de la implicación. No observamos diferencias en cuanto a la complejidad de la implicación y el sexo de los niños.

Encontramos que las dificultades emocionales y la hiperactividad median la relación entre el nivel de desarrollo y la complejidad de la implicación. Asimismo, la implicación con compañeros media entre la conducta prosocial y la complejidad de la implicación y los problemas con compañeros y la complejidad de la implicación.

Los resultados de esta investigación ponen en evidencia la importancia del bienestar emocional de los niños para promover una mayor implicación y en niveles más complejos. Se enfatiza, también, la importancia del juego libre y la exploración para promover niveles de implicación complejos. Se pone de manifiesto la necesidad de aumentar los minutos de juego libre dentro del aula e implementar buenas prácticas relacionadas con el apoyo instruccional dirigido a promover el razonamiento crítico, la planificación y resolución de problemas. Todo ello con el fin de proporcionar a los niños con entornos educativos de alta calidad que promuevan su implicación, aprendizaje de habilidades y desarrollo óptimo.

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