

# Reaching toward Individualization in Planning for Children with Special Needs

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*Abstract: Integrating young children with special needs into programs for typically developing children is a current trend. Yet, integration may threaten a teacher's ability to meet the needs of an individual child. The aim of this study was to gain an understanding of the teachers' orientation in early intervention/early childhood special education. Data from thirteen early childhood generic educators/early childhood special educators were collected to provide a qualitative description of their assessment and planning practices. Findings indicated that generic early childhood/early childhood special educators' assessment, planning, and programming for meeting the needs of individual children were not clearly established. There was incongruence between the teachers' actual practice and the positively -valued guideline of child-centeredness, social aspects of learning and naturalistic teaching strategies.*

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## Introduction

### *Teacher planning in research and literature*

In childcare settings, it is expected that planning and programming are individualized for each child according to his or her strengths and needs. Research suggests that individualized goals and modifications in daily schedules are also needed to ensure learning opportunities for children with disabilities (Fewell & Oelwein, 1990; McLean & Hanline, 1990; Strain, 1990). In addition, Odom and McEvoy (1988) have suggested that children with special needs may not learn spontaneously when exposed to group activities with other children.

However, teacher planning is not a widely researched area within the field of early intervention. Clark and Peterson (1986) reviewed studies that were conducted with school-aged children and examined aspects of teacher thinking (i.e. planning, decision making, judgment, implicit theories, expectations and attributions). Their conceptualization suggested that teacher planning tended to focus on the content and the organization of instruction. Planning is considered to be an essential element of programming (Smith, 1990) and, in early intervention, it is seen as a prerequisite when linking an Individual Educational Plan (IEP) with classroom activities (Bricker, 1998; Hanson & Lynch, 1989). Studies with generic

early childhood educators and early childhood special educators are limited. However, research suggests that teachers' thoughts and beliefs affect their classroom behavior (Clark & Peterson, 1986; File, 1994).

A developmental approach emphasizes the importance of comprehensive assessment when planning early intervention content and strategies. The developmental approach has two components, which Bredekamp (1987) describes as age-appropriate and individually-appropriate practice. Age-appropriateness refers to the typical development of children within a certain age span, and individually-appropriate refers to the unique aspects of each child, such as patterns of growth, personality, learning style, and family background. Accordingly, a child's IEP should contain goals and objectives that guide the content of intervention as well as strategies for teaching the content (Bricker, 1998). Thus, the developmental approach forms the foundation for teaching.

Early childhood special education programs have long relied on behavioral approaches (Bricker, 1998). Behavioral approaches and teaching strategies are characterized by behavioral analysis principles and highly structured, adult-directed training. Debate about the application of these principles has led to increased appreciation of child-initiated activities and a more functional use of behavioral analysis principles

(MacDonald, 1989). The functional approach emphasizes a child-sensitive assessment to determine a child's intervention goals, and embeds these goals in daily activities that are meaningful and functional to the child (Bricker, 1998). Thus, the functional approach can be seen as a transition from a developmental-behavioral emphasis in teaching to a more ecological and naturalistic approach.

An ecological, naturalistic approach emphasizes the provision of normalized life experiences for children with disabilities (Bailey & McWilliam, 1990). Then, the ultimate goal for all children is to have the same opportunities and be involved in meaningful activities with their peers. Definition of the naturalistic approach varies (Bricker, 1998). However, some definitions make a reasonable distinction between a naturalistic setting and naturalistic teaching strategies (Noonan & McCormick, 1993). Accordingly, the emphasis on an ecological, naturalistic approach concerns both the child (e.g. goals, initiations, participation), and the ecology (setting and teaching strategies) that take advantage of a child's initiations and daily routines.

Currently, children with disabilities are frequently enrolled in integrated and inclusive programs (Viitala, 1999; Wolery, Holcombe et al., 1993). This trend in Finland toward more naturalistic programs, in which child assessment and planning are conducted by generic early childhood educators, is similar to trends in

other countries, although the background context may be different, (for example legislation, attitudes, economic and social systems). This trend requires an understanding of teachers' orientation as well as an investigation of the assessment and planning practices of both generic early childhood educators (GEC) and early childhood special (ECS) educators. Teachers are responsible for making decisions about what to teach when developing an IEP for a child with special needs (Wolery, Strain, & Bailey, 1993), but these decisions have not been the focus of research.

It seems reasonable to conclude that in both research and practice, one should carefully consider the impact of individualized programming, especially for children who are vulnerable to environmental and social factors that may hamper a child's interaction and participation. Accordingly, researchers should also focus on the extent to which planning and programming enhance the consistency of intervention goals, strategies and content

### ***Early childhood special education in Finland***

The Finnish Day Care Act (1119/1985) and its regulations (630/1991, 806/1992) mandate a priority for daycare services to children with special needs. Eligibility for services is based on a specialist's statement of a child's need for habilitation and special education services. However, children with special needs under three years of age

are not specifically entitled to special education. The Day Care Act also requires a written Individualized Educational Plan (IEP) for children with special needs. The Act includes a recommendation that a child should attend the nearest day care/educational program which enhances integration of children with and without disabilities.

Children with special needs are enrolled in family day-care homes, in programs that enroll typically-developing young children, in programs which serve both typically-developing young children and children with disabilities (an integrated group), or in programs for special groups of children (a special group). Over 80% of children with special needs receiving day care services are enrolled in day care centers (Viitala, 1999). Children with special needs most commonly participate in programs that enroll typically-developing children. However, generic early childhood educators who are responsible for programming may be less prepared for child assessment and planning for children with special needs than early childhood special educators. Only 7% of children with special needs attended a special group program (Viitala, 1999), partly because special groups are only available in the most densely populated areas in Finland.

There are consultant teachers in early childhood special education who coordinate service provision and provide in-service training for day care personnel regarding

children with special needs. They also participate in decision-making about a child's placement, together with other specialists and parents. These consultant teachers generally guide the process of child assessment and planning. All early intervention services, especially early childhood special teaching and consultation, are provided less often in scarcely populated areas and smaller communities (under 30.000 inhabitants) than would be desirable. This is why GEC educators are generally expected to take the responsibility for assessment and planning for children with special needs. In Finland, there is no research available about teachers' assessment and planning practices. Particularly, the Finnish Day Care Act guideline that emphasizes equal learning opportunities for all children should be evident in teachers' practice and documented by research.

### **Purpose of this study**

The aim of this study is to contribute to our current knowledge of teacher planning in the field of early intervention/early childhood special education. This study especially explores teachers' decisions in individual programming for children with disabilities, by addressing two broad research questions:

(1) How do GEC / ECS educators assess and plan for children with special needs?

(2) What kind of rationale for programming do teachers have?

By investigating the teachers' orientation, one may draw some conclusions about areas to consider in the education and in-service training of GEC / ECS educators.

### **Method**

This study focused on teachers' assessment and planning practices, and aimed at providing insights into the teachers' decisions in programming. A qualitative research design with data collected by interview was used in order to uncover the concepts related to teachers' current understanding of children with special needs and their beliefs about responding to children's needs (Patton, 1990). This design was applied because of its flexibility in gathering data and refining the analysis during the research process, which starts without specific presumptions regarding the phenomenon, and then ends up with methodological rigor and theorization (Silverman, 2000).

### **Informants:**

Of the thirteen teacher-informants, seven were GEC educators and six were ECS educators. Six of the GEC educators were women and one was a man, whereas all of the ECS educators were women. Informants ranged in age from mid-30s to mid-50s. They had an average of 5.11 years of experience

working with children with special needs, and their overall teaching experience ranged from 1 to 24 years. Two of the ECS educators worked as consultant teachers. The participating teachers were from four communities in Finland, with a population size ranging from about 30.000 to 70.000 inhabitants.

The consultant teachers worked with children in day care centers and family day-care homes, providing both direct service and consultation. Direct service included assessment and teaching endeavors with an individual child. Consultation included training and guidance for day care staff. ECS educators worked in integrated programs serving children with disabilities (three to five children), and without disabilities (12 - 14 children in total). The GEC educators worked in programs with one or more children with disabilities integrated into a group for typically-developing children. There were 20- 22 children from three to five years, or 12 children under three years, as well as the child with special needs with the child's individual aide. A child could also be "double placed", which means that one child less is enrolled in the program to ensure that the needs of the child with disability could be better met. In the programs included in this study, children were from 1 to 5 years of age and represented the full range of developmental disabilities, including intellectual, behavioral and physical disabilities.

### *Data collection and analysis*

The primary method used in data collection was audiotaped interviews. Interviews were conducted in two phases. First, both consultant teachers and the five GEC educators were interviewed individually. In these interviews we discussed the following topics:

- (1) how teachers worked with a child with special needs in their group;
- (2) how they aimed to respond to a child's individual needs.

Then, the remaining two GEC educators and four ECS educators participated in three focus groups. In these focus groups, we discussed content questions regarding how to respond to the needs of a child at risk or with disabilities, as well as the related assessment and planning process. The author conducted the focus group sessions, including probing for additional comments and insights to increase the variety of themes discussed, as well as attempts to verify categories found in the preliminary analysis of the individual interviews. Individual interviews were supplemented by group interaction to enhance the variation in the data and to improve the credibility of the findings. Audiotapes from both the individual interviews and the group interaction were transcribed. The verbatim transcripts provided 453 pages for further analysis.

A 'reading - coding - categorization' process in data analysis was applied (Bogdan &

Biklen, 1998). Data were first reduced by coding the responses into simple content units, (such as teachers' statements that expressed an idea in a sentence or two that conveyed information about "assessment process" or "teaching"). Next, the content units were coded and classified in order to subdivide and subsume the content units and to assign them into categories (Dey, 1996). For example "Assessment process" was first divided into these six classes: the beginning of the assessment process, assessment types, measures/instruments, assessment questions, content of plans, and roles in planning. Then these six classes were organized into three categories: (1) assessment information, (2) planning, and (3) content. This phase was also used to discern the variety of perspectives related to each code and category by 'constant comparison' of statements (Glaser & Strauss, 1967). Figure 1 and 2 (cf. the appendix) present the basic findings of this analysis.

The statements from GEC educators and ECS educators were also compared with each other. An 'iterative refinement process' was conducted by looking forward to the overall findings and returning back to the data when developing categories (Dey, 1996). At the end of analysis, additional review was conducted by combining properties in order to identify emerging themes (Glaser & Strauss, 1967). These themes are reported as a summary in each section of the results.

### ***Credibility***

The rigor of data analysis and interpretation must be considered in a study that uses a qualitative approach. Three essential approaches were utilized. First, an assistant independently listed content units and coded the data to verify or further explore the author's decisions. Then we discussed the codings to reach consensus. Second, focus-group interviews and also some in-service training groups for GEC educators were used to review preliminary findings. GEC educators participating in the in-service training had an educational background equivalent to the teachers who had been informants in the study. They also had a child with special needs integrated in their group. Finally, findings are described in this article in some detail, to maximize the possibility of further evaluation of both the methodological process and interpretation of this study by readers. This was done by using quotations from teachers to shed light on the categories and by summarizing the themes in each section of the results.

### **Results**

GEC and ECS educators did not differ remarkably in their viewpoints and attitudes concerning working with children with special needs. GEC educators were found to be less prepared for assessment and planning for children with special needs than were the ECS educators. Nonetheless, teachers' ideas about

assessment and planning tended to be congruent with each other. In addition, all teachers emphasized 'care' over 'teaching', especially with children under three years of age.

The assessment and planning process had two major themes that emerged with regard to meeting the individual needs of a child with special needs. These themes illustrating the actual process of individualization are related to (1) the content of the program plan and (2) specific teaching strategies.

#### ***Individual Educational Plan***

Teachers stated that plans were always individualized for each child. Yet, the plans were described to be more like a collection of documents, including agreements on practical issues, such as transportation or daily routines. Statements about diagnosis and eligibility, and assessment results, for example "*...we use the Portage Early Learning Profile to determine a child's developmental level*", and observational notes were also included in the plan. Teachers expressed uncertainty about writing up the actual educational plan (IEP). This uncertainty was stated in terms of "*...not having a form which would fit all the different groups of children with disabilities*", and "*...the forms did not work well enough*". In addition, program planning was conducted separately, in that teachers and others involved in the process wrote notes about a child's development and behavior. Accordingly, the responsibility for writing up an IEP

for the child was sometimes unclear, as noted by one GEC educator who said about a child's plan "*...the child's special aide wrote notes about what was planned*" and "*...I wrote some notes, but the consultant teacher's notes were more complete*".

The content of the plan was based mainly on a definition of child's needs in terms of "*...skills, that should be developed*". Teachers thought that these needs were not clearly stated as goals in the child's plan. According to Wolery et al. (1993), it is essential when developing an IEP to determine a child's goals and to plan strategies for achieving the goals. Yet, the teachers in this study articulated goals on a broader level and "*...not so specifically that this was the goal; it was more that we noticed a child had learned some skills and we could then try to work on some other skills*". The IEP was not based on what a child should learn, but merely on which activities the teachers and others involved might do with the child. The teachers described the content of the plan more often as tentative trials than systematic programming, for example "*...let's try whether the child likes this or that*", or "*...the consultant teacher said you could do this with the child*". A child's instruction seemed to be guided more by a teacher's intuition, for example as stated "*...responding to a current situation*," rather than by a child's IEP.

In summary, it seems that writing up an IEP is a challenging task for both GEC and ECS educators, especially when the IEP is expected to formulate both the goals and the instructional program plan. Similarly, teachers' knowledge about and the use of assessment instruments seemed vague. There was an incongruity between the ideal of individual planning and the actual formulation of the plan, based on reports that the assessment and planning process typically was not systematic. These findings suggest that addressing specific developmental concerns and using defined measurement procedures to meet the needs of individual children were not employed uniformly.

***Orientation in teaching children with special needs***

As the primary content of teaching, teachers identified adaptive skills, such as *"...basic self help skills like eating and dressing"*. These skills were seen as important both from the child's and parents' viewpoint. Teachers also emphasized the importance of learning social skills in group activities. The degree to which these skills were consistently and individually targeted was not clear in terms of enhancing positive learning experiences or intervening with problem behaviors. Teachers described the content issues as *"...trying out different strategies and techniques that might be useful in teaching an individual child in varying activities"*.

Teachers stressed the importance of group activities with other children who could serve as models for enhancing the progress of children with special needs. Group activities and the social environment were seen as means to contribute to the child's capability and readiness to begin school. Teachers seemed to prioritize early intervention in natural environments also by criticizing the practice of other service providers such as therapists, for example: *"...because they worked with an individual child in separate therapeutic sessions which doesn't provide occasions for teachers to learn from therapists and the child missed so many opportunities for participating in group activities with other children"*.

However, teachers also aimed for individualization of programming by planning adult-child teaching sessions on a daily or weekly basis. The content of these individual training sessions was considered and planned in advance. One example of an individual session was *"...we take some blocks and the child names colors"*. Accordingly, teachers emphasized teaching strategies directed toward individual children. Teaching and instruction were usually described as adult-directed sessions in terms of *"...the child's special aide knew the child best and the techniques to work with her/him, too, and the aide was responsible for the child's program going on"*. Teachers were also concerned about their resources to initiate adequate and consistent training sessions for the

child with special needs. The teachers' most common wish was expressed as follows: *"I just hope we had more time for each child to meet her/his needs by arranging individual teaching sessions"*.

The individual teaching sessions as described above could be considered as the prevailing method of instruction. This individual teaching approach was based on an assumption of instruction (habilitation) as a separate series of activities aimed at enhancing a child's development. This was evident in a teacher's words: *"It is not always possible to include habilitation to a child's schedule, so you can just ignore it, but not for more than one week"*. Instruction was described as an adult-guided, academic approach (such as labeling pictures and naming colors out of context) more frequently than as an approach that supported child-initiated learning opportunities within daily activities.

In summary, instruction (and habilitation) was mainly documented as an adult-directed and sequential process in this study. Teachers emphasized learning in everyday routines with other children (integrated/naturalistic), but they seemed to favor individual (segregated) teaching. This may suggest that these teachers lacked the skills and knowledge of naturalistic and comprehensive approaches in which learning adaptive skills can also contribute to progress in other developmental domains. Teaching strategies and techniques were based on intuitional teaching rather than systematic

programming and individualization of targeted skills within functional activities.

## Discussion

### *Individualization*

GEC/ECS educators shared some basic elements in their orientation, such as (1) child-centered curriculum, (2) emphasis on the importance of social skills, and (3) implementation of behavioral teaching strategies with children with disabilities, especially when teaching cognitive skills. Child-centered curriculum was interpreted as an approach supporting the development and learning of all children and also emphasizing the whole child. Social skills and learning by observing other children were valued as essential learning content in day care for both children with and without disabilities.

The above elements reveal an incongruity between teachers' actual practice and their professed rationale for programming and teaching. Although teachers emphasized the whole child and the integration of developmental domains in learning, they tended to separate cognitive learning from this whole. In addition, teachers considered individual teaching sessions to be more beneficial for a child with disabilities than integrated strategies. Yet, when teaching in isolation, it is difficult to address all domains, especially social skills. The goal of supporting the development and learning of all children is difficult to

achieve when all children are expected to perform the same task or activity at the same time with little or no individualization of instruction.

The three elements of individualization (i.e. child-centeredness, emphasis on social skills, and teaching strategies) deserve careful consideration when assessing a child's interests and needs and when planning adjustments for individual differences. They in turn might help children with disabilities to become more actively engaged, to strive for mastery of environmental demands, and to become as independent as possible (Wolery, Strain, & Bailey, 1993). Although the teachers seemed to share a specialized, clinical orientation towards programming and teaching, they also acknowledged the value of child-centeredness, social aspects of learning, and the naturalistic approach.

The developmental approach emphasizes that the assessment and planning process should include goals and short-term objectives with adequate follow-up procedures for children with special needs (Bricker, 1998). Defining a child's goals and accompanying teaching strategies more systematically may help teachers in responding to the needs of each child within daily routines. There are two reasons for this. First, teachers may find it easier to work with a child when the targeted skills and related instruction are clearly documented. Second, the training of targeted skills within activities may be more meaningful

for the child with special needs when it encourages the child's participation in the group than when it does not. As social skills were seen as important, these procedures could help in focusing more purposefully on the instruction of social skills within group activities.

There was a close relationship between the importance of social skills (and the degree to which the instructional requirements regarding these skills are met) and the curricular decisions and teaching strategies. Curricular decisions have an impact on the type of activities that teachers plan in terms of supporting and guiding social interaction among children with and without disabilities. Decisions about teaching strategies have similar effects. For example, when teachers mainly apply individual teaching strategies with children with special needs, they focus less on model from, participation with and social interaction between peers than expected, based on the teachers' appreciation of the social environment as the context for learning. This was evident especially in cognitive skills: isolated and adult-directed sessions were planned and organized for example to count or label objects.

Results of this study indicated that the teachers had adopted the behavioral approach for specialized teaching. Yet, utilizing the social and physical environment in individualization (i.e. supporting individual progress of all children) yields instructional and teaching strategies

that are social and naturalistic by their very nature. Recent research provides support for individualization in terms of embedding instruction in inclusive settings. For example, in a study by Horn and her colleagues (2000), early childhood educators made progress in embedding instruction that in turn had positive effects on child performance of targeted objectives.

An important aspect of individualization is how teachers create environments that enhance the development of children with disabilities. For a child, an essential goal is active participation and inclusion in common learning opportunities with other children in the varying daily routines and activities. The current teaching strategies were not clearly aimed at meeting the goal of equal, active opportunities for participation. Improved teacher education and in-service training in integrated and naturalistic teaching settings are needed.

### ***Limitations of the study***

Results of the present study should be considered as a pilot exploration of Finnish GEC / ECS educators' orientation and attitudes in the assessment and planning process. Although the results discussed generally indicated congruencies between the interviews and the subsequent in-service training programs, the study was subject to several limitations. First, the collection of observational data might offer a more detailed description of the actual teaching strategies that GEC /ECS educators use. The distinction

between teachers' actual practice and their ideal of individualization could also become more evident by using observational data and not only interviews. Second, future studies should address other evidence by investigating the written content of actual IEP/IFSPs, and by examining if high/low quality IEPs affected teaching strategies and a child's engagement in a program. Third, other day care personnel also have an important role in instructing children with disabilities. For example, the role of special aides should be addressed. Finally, the use of the ISP/IFSP as a tool for individualization also indicates a need for examining program planning so that the nature of disabilities is addressed.

### **References**

- Bailey, D. & McWilliam, R. (1990). Normalizing early intervention. *Topics in Early Childhood Special Education*, 10, 33 - 47.
- Bogdan, R. C. & Biklen, S. K. (1998). *Qualitative research for education. An introduction to theory and methods*. Needham Heights, MA: Allyn & Bacon.
- Bredenkamp, S. (1987). *Developmentally appropriate practice in early childhood programs serving children from birth to age 8* (rev.ed.). Washington, DC: National Association of the Education of Young Children (NAEYC).
- Bricker, D. (1998). *An activity-based approach to early intervention* (2<sup>nd</sup> ed.). Baltimore, MD: Paul H. Brookes.
- Clark, C. M., & Peterson, P. (1986). Teachers' thought processes. In M. C. Wittrock (Ed.) *Handbook of research on teaching* (3<sup>rd</sup> ed., pp. 255 - 296). Chicago, IL: Rand McNally.

- Dey, I. (1996). *Qualitative data analysis. A user-friendly guide for social scientists*. London: Routledge.
- Fewell, R. R., & Oelwein, P. L. (1990). The relationship between time in integrated environments and developmental gain in young children with special needs. *Topics in Early Childhood Special Education*, 10, 104 - 116.
- File, N. (1994). Children's play, teacher-child interactions, and teacher beliefs in integrated early childhood programs. *Early Childhood Quarterly*, 9, 223 - 240.
- Glaser, B. G., & Strauss, A. L. (1967). *The discovery of grounded theory: Strategies for qualitative research*. Chicago, IL: Aldine.
- Hanson, M. J., & Lynch, E. W. (1989). *Early intervention: Implementing child and family services for infants and toddlers who are at-risk or disabled*. Austin, TX: PRO-ED.
- Horn, E., Lieber, J., Li, S., Sandall, S., & Schwartz, I. (2000). Supporting young children's IEP goals in inclusive settings through embedded learning opportunities. *Topics in Early Childhood Special Education*, 4, 208 - 223.
- MacDonald, J. (1989). *Becoming partners with children*. San Antonio, TX: Special Press.
- McLean, M., & Hanline, M. F. (1990). Providing early intervention services in integrated environments: Challenges and opportunities for the future. *Topics in Early Childhood Special Education*, 10, 62 - 77.
- Noonan, M., & McCormick, L. (1993). *Early intervention in natural environments*. Pacific Grove, CA: Brookes/Cole.
- Odom, S. L., & McEvoy, M. (1988). Integration of young children with handicaps. In S. L. Odom & M. B. Karnes (Eds.), *Early intervention for infants and children with handicaps: An empirical base* (pp. 241 - 267). Baltimore, MD: Paul H. Brookes.
- Patton, M. Q. (1990). *Qualitative evaluation and research methods* (2<sup>nd</sup> ed.). Newbury Park, CA: Sage.
- Silverman, D. (2000). *Doing qualitative research. A practical handbook*. London: Sage.
- Smith, S. W. (1990). Individualized education programs (IEPs) in special education: From intent to acquiescence. *Exceptional Children*, 57, 6 - 15.
- Strain, P. S. (1990). LRE for preschool children with handicaps: What we know, what we should be doing. *Journal of Early Intervention*, 14, 291 - 296.
- Viitala, R. (1999). *Integraatio ja sen toimivuus lastentarhanopettajien arvioimana*. [Integration. How do early childhood teachers evaluate success of integration?] Unpublished licentiate's dissertation, University of Jyväskylä, Jyväskylä, Finland.
- Wolery, M., Holcombe, A., Venn, M. L., Brookfield, J., Huffman, K., Schroeder, C., Martin, C. G., & Fleming, L. A. (1993). Mainstreaming in early childhood programs: Current status and relevant issues. *Young Children*, 49, 78 - 84.
- Wolery, M., Strain, P. S., & Bailey, D. B., Jr. (1993). Reaching potentials of children with special needs. In S. Bredekamp, & T. Rosegrant (Eds.), *Reaching potentials: Appropriate curriculum and assessment for young children* (3<sup>rd</sup> ed., pp. 92 - 111). Washington, DC: National Association for the Education of Young Children (NAEYC).

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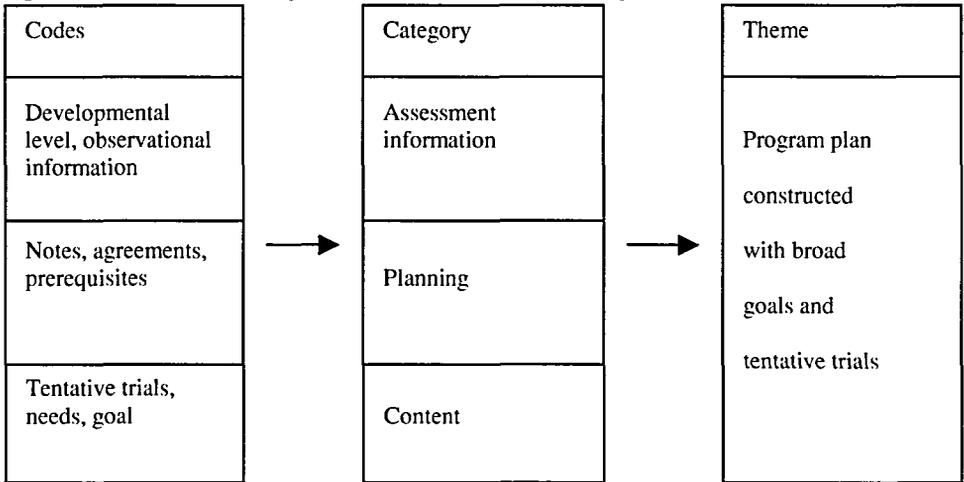
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**Appendix**

**Figure 1. Basics of data analysis in assessment and planning process**



**Figure 2. Basics of data analysis in teaching**

